Telephone Engineer

WITH WHICH IS CONSOLIDATED THE WESTERN TELEPHONE JOURNAL
ESTABLISHED 1902

VOL. XIII — CHICAGO, FEBRUARY, 1915 — No. 2

PUBLISHED MONTHLY BY THE
ELECTRICITY MAGAZINE CORPORATION
Monadnock Building, Chicago.

Ed J. Mock and Paul H. Woodruff, Editors.
FRED B. SCHAFER, ASSOCIATE EDITOR.
TELEPHONES: HARRISON 3014-3015.

NEW YORK OFFICE.....1022 Longacre Bldg., 42d Street and Broadway
LONDON OFFICE.....36 Maiden Lane, Covent Garden
S. RENTELL & Co., Representatives.

Entered as second-class matter May 26, 1909, at the postoffice at Chicago, Illinois, under Act of March 3, 1879.

TERMS OF SUBSCRIPTION.

United States, Cuba and Mexico	Per year,	$2.00
Canada	Per year,	2.50
Foreign countries within the Postal Union	Per year,	3.00
Single Copy		.20

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach the office of publication not less than ten days in advance of date of issue. Regular date of issue, the first day of each month. New advertisements will be accepted up to within five days of date of issue, but proof of such advertisements can not be shown in advance of publication.

NOTICE TO SUBSCRIBERS.

REMITTANCES.—Remittances should be made by check, New York draft or money order, in favor of TELEPHONE ENGINEER. Foreign subscriptions may be remitted direct by International Postal Money Order, or sent to our London office.

CHANGE OF ADDRESS.—The old address should be given as well as the new, and notice should be received two weeks in advance of the desired change.

CLUB RATE.—In acknowledgment of assistance rendered by subscribers in the securing of new orders, a club rate of $1.75 per annum is quoted. This rate applies to new subscriptions in clubs of two or more.

This publication is free and independent of all business or house connections or control. No telephone company, manufacturer or supply dealer, or their stockholders or representatives have any financial interest in TELEPHONE ENGINEER *or any voice in its management or policy.*

CHICAGO, FEBRUARY, 1915

TABLE OF CONTENTS.

Editorial	47-49
Convention Season	47
"Telephone Talks"	47-48
"Beating the Nickel Telephone"	48
The Thermo-Receiver	48-49
Tacoma Mayor Opposes State Commission	49
New Improvements for Milwaukee	49
Picture Pages	50-51
National Independent Telephone Association, Eighth Annual Convention	52
New York Talks to San Francisco	53-55
Joplin Home Asks Rate	55
War Affects A. T. & T. Growth	55
Free Service Denied by Michigan Court	55
Second Annual Convention of the Independent Telephone Association of America	56
Big Convention in Minneapolis	57-62
Telephone Talks by G. W. Cummings and Arthur Kneisel	63-66
Automanual Equipment at Lima. By Garrison Babcock	67-68
How Ohio State Company's Operators Work	69-72
Public Utility Commission News	73-75
The Thermol Telephone. By M. De Lange	76-77
European Telephone Developments. By Fred W. Scholz	78-83
Of Interest to the Trade	84-86
Manufacturers' Exhibit at the Convention	87-88
Western Red Cedar Association Meets	88
Ohio Independents Meet at Dayton	88
Minnesota Independents Convene	88
Registered at the Convention	89-92
Western Pennsylvania Independents Convene	92

CONVENTION SEASON.

THOSE who have cherished a fond hope that the two national independent associations might find some method of eliminating one-half their number must feel a slight discouragement. The Independent Telephone Association of America, whose just completed convention is only the second in its history, almost flew in the face of fate with it and came through with flying colors. When the newest association deliberately carried its second annual meeting four hundred miles from Chicago it forced the manufacturers who help support it to establish two exhibits where one might have sufficed, and it made more glaringly apparent the fact that there *are* two associations in the independent field. Yet no one can say less for the Minneapolis convention than that it was a big, successful, full-blooded and, above all, a useful convention. The younger association is holding easily to the pace it set from the first.

Comparisons, as President Fisher remarked, are odorous; and we are spared the necessity of making any here, even unwittingly, by the fact that the old association's convention is just starting, and it will be another month before we can comment on it. We cannot even get the two associations together in one issue of the paper this year.

Nevertheless, there are certain things accomplished by conventions for the good of the whole art, and these obviously cannot all be recorded between the covers of a single issue of any magazine. Neither this editorial, nor the convention report on other pages, constitutes all we shall have to say on the accomplishments of the independent convention at Minneapolis.

Meanwhile we hope the eighteenth annual convention of the National Independent Telephone Association in Chicago may be at least as successful and enjoyable as were the seventeenth, the sixteenth, and all the preceding annual events that stretch back into independent telephone history.

"TELEPHONE TALKS."

IN CONNECTION with the publication of our educational serial "Telephone Talks," the second installment of which appears in this number, several readers have indicated a desire to join in the deliberations of the "Technical Club" whose proceedings form the basis for the articles. Some of these interested ones have questions of their own to ask; others think they can make the subject a little clearer, or add a little to it.

We want to say right here and now that you are all welcome to membership in the Technical Club of Messrs. Cummings and Kneisel. Not even such thoroughly practical engineers, educators and writers as these authors can always be sure that *everybody* understands *all* they write, or that they have said all there is to say on any subject.

So their Technical Club and its "Telephone Talks" belong to our readers. We would like to have not only the repairman, the wire chief and the helper of the story, but every other repairman, wire chief and helper in the business join in with questions and discussions.

So when you read "Telephone Talks" and come across a term you are not familiar with, or an explanation you do not understand, or have a bit of information you are willing to help the other fellows with, don't hesitate to rise up and shout, "Mr. Chairman!" This is particularly easy to do, even if you are a bit bashful, because all you need is a scrap of paper, a pencil, an envelope and a postage stamp.

You telephone workers—ground men and line men, repair men and helpers—whatever your particular present part in the game, let's hear you all join in the discussions of the Technical Club.

BEATING THE NICKEL TELEPHONE.

NOT having access to the circuit diagrams of nickel-in-the-slot telephones of all the telephone companies, we are unable to tell how widespread may be the dishonest use of such instruments. In Chicago at least we have discovered evidence that the practice of "beating the telephone company" is quite prevalent. The method used is peculiar, and seems to indicate the necessity for a change in the nickel signal circuit, or at least in one of its contacts.

The use of the desk set has become almost universal in Chicago, in both office and residence installations. These sets are installed with the ringer box and coin receiver mounted on the wall, the desk stand being connected to it by a few feet of cord, as usual. Most of Chicago's nickel telephones are operated on what is called the Hoefer system. In this system the subscriber lifts his receiver, the operator calls for number, and the subscriber immediately deposits a nickel in its slot. This act carries a signal to the operator, who thereupon sets up the desired connection.

The dishonest subscriber who knows the trick, instead of sitting down in front of his desk set, lifts the set in his right hand. It should be noted that the ends of the switch-hook are round and, by some strange dispensation, exactly the same size as a nickel. As soon as the subscriber has given the operator his call he places one of the nickel-shaped prongs of his switch-hook in the *ejection* slot of his coin box—that is, the slot provided for the return of the nickel to the subscriber. It has been discovered by some malingenious person that the contact so established conveys to the operator the same signal that a nickel properly deposited conveys.

One might naturally suppose that so technical a trick as this would be known to so few as to be inconsequential. That was our own impression when we first heard of it. But with an observation sharpened by the information, and largely assisted by pure accident, or "luck," if you will, we have subsequently found that the principle is quite widely known—astonishingly so, in fact.

How any considerable number of laymen, with no knowledge whatever of circuits, could discover the possibility of this illicit connection must, we fear, remain a mystery. Possibly some disgruntled or discharged employe of the company started the dissemination. Possibly it can be accounted for by the fact that the possessor of a choice bit of wisdom like this cannot keep it to himself. If the discoverer told four others, and each of these told four more, and so on, ordinary arithmetic teaches us that only seven links in the chain of information would let over five thousand people into the secret. With all due respect to human nature, we fear that at least two thousand out of the five would use it—at times, anyway.

It is a well known human idiosyncrasy to regard public service corporations as lawful prey. It is astonishing and quite disconcerting to observe how many are willing and anxious to beat the street car company or the railroad out of its fare. And if this is true in public places, how much greater must be the temptation to beat the telephone company in the privacy of one's own home, with none to know of the dereliction. The dear public undoubtedly needs moral education. But in the meantime the public utilities must protect themselves.

We feel called upon to suggest that the Chicago Telephone Company alter the circuit of its coin boxes on nickel telephones.

THE THERMO-RECEIVER.

IN HIS paper on the thermal telephone, appearing in another part of this issue, Mr. de Lange calls specific attention to the fact that there is nothing new in the principle of his invention. Some thirty-five years ago Sir William Pierce succeeded in reproducing articulate speech at a diaphragm whose vibrations were excited by the expansions and contractions of a fine wire thermally influenced by the voice currents from a transmitter (microphone) and battery. This principle is mentioned even two years earlier than that, by Theodor Wiesendanger.

The earlier days of any scientific art are days of active experimentation. The system finally accepted rises out of a host of variations and alternative methods, and is accepted because it is *first* in the race to reach commercial practicability—not necessarily because it is the *only* practical form. But once this particular method has been selected, it is the habit of the world to drop all consideration of the other experimental forms and concentrate its attention on the perfection of the accepted one. Every technical art's history shows a list of abandoned inventions and methods which were tacitly checked off as unfit, and are still so regarded by those who remember them at all. Yet their unfitness was probably merely comparative at the time final selection was made; they were not quite so good in experimental results, or quite so cheaply made, or quite so aggressively pushed forward as the method that was finally accepted. Somewhere among these old files there is a wealth of opportunity for the rejuvenation of ninety-per-cent-completed ideas and almost-perfected inventions. And fortunately the world still has a few disinterested scientists who, for pure love of investigation, continue to pore over the records of early experiment and to build new models upon old principles.

There is little likelihood that Mr. de Lange's thermophone will displace the magnetic receiver in the equipment of operating telephone companies' subscriber sets. That, however, does not keep it from being extremely interesting, nor even from showing some characteristic points of improvement over the magnetic type. Having no diaphragm, the thermal receiver has no dominant period of its own; it does not, therefore, tend to reinforce certain tones as does

the magnetic receiver. There should logically be greater purity and uniformity of tone in the de Lange instrument. Furthermore, it is irreversible; that is, it will not act as a transmitter, and consequently will not pick up extraneous sounds, or reinforce those picked up by the transmitter.

These advantages, combined with the fact that the instrument can be constructed at a much lower cost than can the magnetic receiver, seem to indicate the probability of some sort of practical application being found for it in the scheme of telephonic economy.

IOWA TESTS FIRE ALARM DELAY.

WHETHER the Iowa Telephone Company can be held responsible for damages resulting from fires if its operators fail to send in an alarm promptly is being tested in the Iowa supreme court by the Providence-Washington Insurance Company, appellant, in an appeal with a sum of $2,750 involved.

According to the abstract of record which is on file, fire destroyed an automobile owned by Dr. J. T. Haller of 730 East Fourteenth street, Davenport, on June 23, 1913. The car was insured and the company paid the damages, then filing suit to recover from the telephone company on the claim of negligence in sending in the alarm. The telephone company denied negligence. The judge of the district court at the trial directed the jury to return a verdict for the telephone company.

Haller says that when he first discovered the fire he telephoned to central and told her to call the fire department, giving the location of the fire. The blaze was then small, and there would have been time to have saved the barn and the auto, he asserted. The fire department failed to arrive, and Haller claims he telephoned twice more. A neighbor says he also told central twice of the fire. A half hour later the fire department arrived, but too late to save the automobile.

The telephone company in Davenport has the same sort of an arrangement for calling the fire department that it has in other cities. It gives its subscribers instructions not to call the fire department direct, but to tell the operator of a fire and she is expected to pass the information on to the department. The insurance company claims that the telephone company is obligated to send in the alarm, and that delays of its operators can be held against the company.

TACOMA MAYOR OPPOSES STATE COMMISSION.

TACOMA, Wash., through its mayor will present a franchise ordinance to the city council calling upon the Sunset Company to reduce its rates 33 per cent for residence telephones and 25 per cent for business offices.

Should the state supreme court decide against the city and hold in the case now before it that the Sunset Company has the right to operate under the old Home Company franchise, the mayor's ordinance would be ineffective unless the legislature at the approaching session lessens the power of the public service commission over first class cities, giving municipalities the authority to regulate private corporations within their limits. If the public service commission's powers are not curtailed by the legislature and the Sunset Telephone Company wins in the supreme court it will continue to operate under the Home franchise several years. The Sunset Company's franchise runs out March, 1915.

WASHINGTON SETS APPRENTICESHIP TIME.

WHEN the $9 minimum wage for telephone operators became effective September 7, beginners were allowed to work for a nine months' apprenticeship period to learn the work before becoming entitled to rating as experienced operators entitled to the full minimum wage, under decision reached by the industrial welfare commission at Olympia, Wash.

The first three months the employe is entitled to not less than $6 per week, the second two months to $6.60, the next two months to $7.20 and the next two months to $7.80, the commission has so decided. This policy will be followed in issuing apprenticeship permits in Seattle, Spokane and Tacoma as a trial and may be changed later by the commission, which reserves the right to treat individual cases differently or to adopt different policies in communities where different living and working conditions prevail.

CHICAGO SHOWS GAIN IN TELEPHONES.

CHICAGO Telephone Company, during 1914, installed 101,434 new telephones, as against 99,185 in 1913, an increase of 2,249 for the year, according to the annual report of B. E. Sunny, president.

Service was discontinued, however, on 63,527 telephones in 1914, as compared with 52,079 in 1913, showing an increase in the number of telephones on which service was discontinued in 1914, of 11,448.

The net increase in telephones for 1914 was 37,907, while for 1913 it was 47,106. The gain in telephones for the year was 9,200 less than for the previous year.

The figures covering Chicago and the suburban division, total number of telephones, is now 468,719; 382,133 of which are in the city, and 86,586 in the suburbs.

NEW IMPROVEMENTS FOR MILWAUKEE.

AT a meeting of the board of directors of the Wisconsin Telephone Company held at Milwaukee, Wis., expenditures amounting to $215,000 for additions to and improvements in the company's property in Milwaukee and expenditures amountinig to $115,000 for additions to and improvements in the company's property in the state, outside of Milwaukee, were approved.

Alonzo Burt of Chicago, first vice-president and treasurer of the company, said the $215,000 set aside for expenditure in Milwaukee would be used in the improvement of the system—new cables, extension of lines and in apparatus.

The regular quarterly dividend of $2 a share was voted.

The Baxter Telephone Company of Baxter Springs, Kan., has carried its case against the Cherokee Mutual Telephone Company from the district court to the state supreme court. The Baxter Company seeks to restrain the Cherokee Company from constructing a competing telephone system in Baxter Springs.

A new exchange has been cut into service by the Central Union Telephone Company at South and Hawley streets, Toledo, O. The exchange equipment has an ultimate capacity of 2,000 lines, 1,200 of which have already been cut into service. The building is a two-story brick structure, modern in every detail and will be known as the Broadway exchange.

A German Corps Placing Telephone and Telegraph Wires Through a Forest in Northern France. A Specially Built Conveyance Carries a Huge Coil of Wire Which Unwinds as the Vehicle Moves. The Soldiers Use Long Poles Which Make It Possible to Hoist the Wire Up Into Tree Branches, Thus Affording a Support and Simultaneously Concealing the Line. Army Officers Find a Great Value in the Temporary Telephone Line, It Keeping Them in Absolute Touch With the Rear Guard and the Officers of the Advance Corps.—Copyright by New York Times.

Miss Irene Estelle Hough at Her Switchboard in an Essanay Film Drama. Miss Hough, a Supervisor Employed by the Nebraska Telephone Company at Omaha, Is Declared to Be the Most Beautiful Telephone Operator in the United States. This Was the Result of a Contest Started by the Essanay Company, Chicago Film Producers, and Miss Hough Is to Be Seen in the Character of a Mimic Operator. Before Miss Hough Was Selected Several Hundred Photographs From All Parts of the Country Were Considered.—Photo by Essanay.

Miss Beatrice U. Mulvaney, Toll Operator at Newton, Kansas, Winner of First Prize in the Contest at the Gem Theatre in September as the Most Popular Girl in Newton, Receiving 143,265 Votes, With Her Closest Competitor 50,000 Votes Behind. The Prize for the Winner Was the Choice Between a Trip to California and $60.00 Expense Money, or a Check for $120.00.

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

German Field Telephone Which Is Carried Into the Outermost Trenches. The Portable Telephone Line Is Considered as One of the Most Essential Factors of Modern Warfare. Officers from Every Division Keep in Touch With the Various Movements of the Army. By Use of the Portable Telephone, Officers Are in a Position to Give Their Instructions Directly to the Soldiers in the Trenches at the Front. As Shown in the Photograph, the Wire Line Is Carried on a Large Spool Mounted on a Carrier Which Allows the Line to Unwind as the Instrument Is Moved. —Copyright by New York Times.

A Field Telephone Station of the German Army of the West Connecting It With the Commander of the Corps. The Portable Field Telephone Attached to a Nearby Tree and Is Extended to Other Points as the Commander Moves His Headquarters.—Copyright by Scientific American.

A Lighter Portable Telephone Outfit. The Wire Is Carried on a Hand Reel and Unwinds or Rewinds as Necessity Demands Moving the Instrument. The Outfit Is Compact and Easily Attached by Means of Straps.

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

Eighteenth Annual Convention National Independent Telephone Association

GENERAL PROGRAM

FEBRUARY 3—10:30 A. M.

Address of welcome on behalf of the Chicago Association of Commerce by Edward E. Gore, Chicago.

Response in behalf of the convention by S. G. McMeen, president Ohio State Telephone Company, Columbus, Ohio.

President's annual address, President N. G. Hunter, Wabash, Ind.

Business Session—Appointment of committees, etc.

2:00 P. M.

The Results of Government Ownership of Telephone Systems of Canada. Address by Francis Dagger, Electrical and Telephone Experts, The Ontario Railway and Municipal Board, Toronto, Canada.

The Iowa Idea. Address by H. B. Shoemaker, Commercial Telephone Company, Toledo, Iowa.

The Individuality of the Operator. Address by G. R. Johnston, vice-president Ohio State Telephone Company.

The Bell Qualified Toll Line Contract. Report of Conference Committee submitted by F. B. MacKinnon, secretary National Independent Telephone Association.

Business session.

FEBRUARY 4—2 P. M.

The Telephone Problem. Address by Hon. Richard Yates, Springfield, Ill., member Illinois Public Utilities Commission.

Valuation of Telephone Properties. Address by Hon. E. W. Doty, Cleveland, Ohio, member Ohio Public Utilities Commission.

Public Convenience and Necessity. Address by Hon. Lawton T. Hemans, Lansing, Mich., chairman Michigan Railroad Commission.

Commission Control. Address by Hon. D. M. McIntyre, Toronto, Canada, chairman Ontario Railway and Municipal Board.

6:30 P. M.

Banquet and entertainment.

FEBRUARY 5—1:30 P. M.

Reports of committees.
Adoption of resolutions.
General business session.
The convention halls will occupy the 19th floor, Hotel LaSalle.
Manufacturers' exhibits, the 17th floor.
Association registration headquarters, room 1757.
Coat and hat check room, 1758.

ACCOUNTANTS DIVISION PROGRAM.

FEBRUARY 4—10:00 A. M.

"The Accounts as Prescribed by the I. C. C. for Class C." Explanation in detail, illustrated by forms, by C. A. Bennett, general auditor Kansas City Home Telephone Company, Kansas City, Mo. Mr. Bennett will conduct a practical blackboard demonstration illustrating the proper handling of the accounts of a Class C company under the system prescribed by the Interstate Commerce Commission.

FEBRUARY 5—10:00 A. M.

The Classification of Accounts for Classes A and B as Prescribed by the I. C. C. Discussion led by Le Roy Parker, general auditor for the Ohio State Telephone Company, Columbus, Ohio.

Statement by representative of Interstate Commerce Commission.

Discussion of Uniform Accounting Systems by State and Interstate Commissions.

ENGINEERS' DIVISION.

FEBRUARY 4—10:00 A. M.

Intangible Values. Discussion by J. C. Kelsey, vice-president Telephony Publishing Company.

Present Values. Discussion by Kempster B. Miller, member of McMeen & Miller, chief engineer for the receiver of the Central Union Telephone Company.

FEBRUARY 5—10:00 A. M.

Unit Costs. Discussion by W. F. Sloan of the firm of Sloan-Huddle-Feustel & Freeman, formerly engineer for the Wisconsin Railroad Commission.

Depreciation. Discussion by E. C. Hurd of the firm of Hurd & Gerber, Lincoln, Neb., formerly engineer for the Nebraska Railroad Commission.

The two technical divisions are to meet separately at the same hours. No general meetings are scheduled at the same time as the technical meetings.

Setting a Pole in a Swamp Valley.

Hauling 18-Foot Poles Over Nevada Bad Lands.

New York Talks to San Francisco

Completion of the A. T. & T. Company's Transcontinental Line

MARCH 10, 1876, represents the date of the first successful test of the telephone by Alexander Graham Bell, at No. 5 Exeter Place, Boston, Mass.

The first words uttered were: "Mr. Watson, come here, please, I want you." These words were spoken by the inventor to his assistant, Mr. Watson. On January 25, 1915, Professor Bell spoke across the continent of North America, that is from New York City to San Francisco, to his same friend and former associate, Mr. Watson, over the longest telephone line ever constructed. This wonderful success and invention which, without a doubt, is one of the greatest in all history, is the realization of a dream which Theodore N. Vail, with the assistance of the engineering genius of John J. Carty, has been able to put into practical use. To these two telephone history makers the glory of this achievement must be attributed.

The Transcontinental line represents a period of two years of construction work. However, considerable of the construction dates back many years, in which portions of the construction work has been being perfected. Innumerable experiments and improvements, in fact every development, has been at a great expenditure. Alexander Bell's original transmitter has been improved in 73 types; 53 types and styles of receivers have been accepted since 1877. Figures show that within the last ten years the Bell system has expended for construction and reconstruction, money equal to the present value of its entire plant. The accompanying illustrations clearly indicate a few of the problems and accompanying expense confronted by Bell engineers in building this line from Denver to the coast. The great work began at New York, and thousands of improvements were necessary in order to establish this 3,400-mile telephone talk. Transmitters, metallic circuits, switchboards, hard-drawn copper wire and loading coils all had to be attuned to the transcontinental keynote.

It was not purely a question of motive power in order to talk across the continent, but more so the making perfect of major and minor parts which were carrying instantaneously thousands of minute waves made in the air by the voice with all their separate

Erecting Poles Across Humboldt Lake, Churchill County, Nevada.

Moving a Camp from Desert to Eagle Salt Works.

Boring Pole Holes in Humboldt Lake, Nev.

Setting Survey Stakes.

shapes and individualities preserved. Words spoken across the new line traveled at 56,000 miles per second. If there was a possibility of speaking from New York to Chicago without the assistance of the wires and electricity, voice waves could not be transmitted in less than four hours. Consequently it can readily be seen that the telephone not only transmits speech, but transmits it thousands of times faster than its own normal speed. If the smallest point of construction is not absolutely perfect, or if there is the least imperfection, all these miles of line would be useless and the sound waves could not be transmitted properly. One can hardly imagine the multitudinous improvements and perfections which have been developed in order to overcome any possibility of an erroneous condition in construction.

This line achievement is routed from West to East as follows: San Francisco to Salt Lake City, 770 miles; Salt Lake City to Denver, 580 miles; Denver to Omaha, 585 miles; Omaha to Chicago, 500 miles. After reaching Chicago, the line branches to Pittsburgh, 545 miles, and then to New York, 390 miles. The second branch goes from Chicago to Buffalo, 603 miles; from Buffalo the line is continued to Boston, 465 miles. Pittsburg also has a continuation extending to Baltimore and Washington.

Hard-drawn copper wire is used throughout the lines with a diameter of 0.165 inches. The total weight of one circuit, consisting of two such wires, is 1,480 tons. 130,000 poles support this line. In two physical circuits of the line there are 13,600 miles of copper wire.

The formal ceremonies in celebration of the completion of this long-distance line occurred at 4 p. m., at 15 Dey Street, New York, N. Y. Among those present were Union N. Bethell, senior vice-president of the American Telephone & Telegraph Company; Alexander Graham Bell; John J. Carty; Mayor John P. Mitchell; George McAneny; William A. Pendergast and C. E. Yost.

The telephones were arranged with a receiver for each one at the head table and transmitters for Dr. Bell and John J. Carty, chief engineer of the A. T. & T. Company.

At 4:30 p. m., New York time, Dr. Bell held a conversation over this line with Thomas A. Watson at his office in San Francisco. This was the first public demonstration of the use of the telephone across the continent. Dr. Bell's first words, in fact the first official utterance over a telephone line 3,400 miles long were: "Mr. Watson, are you there?"

Following Dr. Bell's conversation Theodore N. Vail, president of the American Telephone & Telegraph Company, spoke from Jekyl Island with Mr. Watson in San Francisco. When Theodore N. Vail spoke with Mr. Watson his voice traveled 1,000 miles

Pole Line in Nevada Salt Swamps.

Hanging Lines in the Nevada Swamp District.

up the Atlantic seaboard to New York before it started on its journey across the continent, at a total distance of 4,400 miles.

The most interesting event of the ceremonies came when the President of the United States spoke from the White House at Washington with Mr. Moore of the Panama Exposition at San Francisco. The conversation was distinctively understood by both speakers and was as follows:

Mr. Moore, it appeals to the imagination to speak across the continent. It is a fine omen for the exposition that the first thing it has done is to send its voice from sea to sea. I congratulate you on the fine prospects for a successful exposition. I am confidently hoping to take part in it after the adjournment of Congress. May I not send my greetings to the management and to all whose work has made it possible and has made it the great event it promises to be and to convey my personal congratulations to you.

From San Francisco Mr. Moore replied:

We are looking forward to your coming here. I think you will be well pleased with what we have done. I assure you, Mr. President, that you will never receive a welcome that will be more cordial and more enthusiastic.

Following this conversation President Wilson spoke to Mr. Watson in San Francisco, with Dr. Bell and others listening in on the line at New York. The President then congratulated Dr. Bell on his remarkable achievement. By request Dr. Bell was asked to employ the original transmitter, using exactly the same words he had uttered first into the telephone at Boston, back in 1876. Dr. Bell attached the apparatus and again said, "Mr. Watson, to come here, please." Mr. Watson's reply, heard by those who had receivers to their ears, was that he could not come as quickly as the first time Dr. Bell called, thirty-nine years ago.

It was stated by the officials of the company that the transcontinental line will be ready for commercial use by March 1, 1915. The rates have been estimated at $20.70 for three minutes and $6.75 for each additional minute. It is further announced that when a circuit is carrying a message from New York to San Francisco about $2,000,000 worth of apparatus will be in exclusive use.

Joplin Home Asks Rate Revision

Information concerning the Home Telephone Company's business in Joplin, Mo., has been presented to the city commission by the vice-president of the company. The company recently filed with the Missouri Public Service Commission a revised schedule of rates that it proposes to place into effect February 1.

Pamphlets explaining the telephone situation were sent to every patron of the company, although half of its subscribers would not be affected by the proposed changes. A more detailed statement will be compiled by the company and will be presented to the commission. The statement will explain the various revenues of the company and will analyze operating cost. How much is spent as salaries of officers, wages for girls and various workmen will be set forth, and the income from every kind of service will be reported. The valuation of the property also will be given, so that the commission can ascertain what it believes would be a fair profit to the company.

Included in the statement that will be prepared for the commission will be figures concerning telephone rates in various other cities in southwest Missouri in which the company operates, so that the commission can make a comparison. There also will be figures of rates in various other cities of Joplin's size.

Many replies have been received by the telephone company from subscribers to whom were sent explanatory pamphlets a few days ago. Sentiment seems to be with the company in its attempt to obtain more equitable rates, and the letters disclose a friendly feeling on the part of the public.

War Affects A. T. & T. Growth

At the end of December the Bell system had a total of approximately 8,600,000 stations of which 5,750,000 were owned stations and the balance connected stations. This total of 8,600,000 stations represents a gain for the year of 467,000, or 5.7 per cent. It is the smallest gain in several years and contrasts with a 1913 increase of 676,000 stations, or 9.0 per cent.

During the six months to June 30 the Bell system increased its stations by 307,000, an annual rate of 614,000. In other words, during the second half-year covered by the war the company added but about 50 per cent as many stations as during the first six months.

The encouraging fact is that the falling off in station growth has shown a progressive improvement. During September the gain in stations for the system was 21,000 less than the same month of 1913. During October the comparative decrease had fallen to 18,000 and further betterment in November reduced the shrinkage to 15,000.

This is the most emphatic reminder which the telephone industry has ever received of the personal economy induced by the conditions growing out of a world war. In years past nothing has been more stable than the growth in Bell stations. It is safe to state that war economies cut down this growth at least 200,000 stations during 1914.

As things were headed at the end of 1913 it was a reasonable expectation that the Bell system would reach the 10,000,000 station mark before the middle of 1916. Perhaps the best that can now be said is that the 10,000,000 mark should be reached by the beginning of 1917.

Keystone Has Best Year in 1913

The Keystone Telephone Company, Philadelphia, Pa., in 1914 had the largest gross and net earnings in its history, according to figures submitted at the annual meeting of stockholders. The twelve months' showing was as follows:

	1914.	1913.
Gross earnings	$1,321,227	$1,265,779
Operating expenses and taxes	651,810	640,206
Net earnings	669,417	625,575
Less interest charges	311,900	306,495
Net earnings	357,517	319,078

The net surplus of $357,517 for the year was equivalent to 18.45 per cent on the $1,936,850 preferred stock, compared with 16.47 per cent in 1913.

Free Service Denied by Michigan Court

The petition of Earl Goldsmith, of Wayne, Mich., for a mandamus compelling the People's Telephone Company, of Wayne, to give him telephone service, was denied by the circuit court.

Mr. Goldsmith is an original stockholder of the telephone company. His petition set forth that when he purchased the stock, it was agreed that he was to have service free of charge. Later the company assessed a charge of $4 a month and subsequently increased the charge until it was $12 a month. Goldsmith refused to pay, and the company, he alleged, removed the telephone instrument from his residence.

Second Annual Convention of the Independent Telephone Association of America Held at Hotel Radisson, Minneapolis, Minn.

Big Convention in Minneapolis

Independent Telephone Association of America Holds Second Annual Event

MINNEAPOLIS, MINN., emphatically made good as a telephone convention city when the Independent Telephone Association of America forsook Chicago for its second annual meeting, January 19, 20 and 21. Some three hundred good telephone men who attended, and many of whom were skeptical before the event, are now convinced that an independent telephone meeting can be taken out of Chicago with profit and pleasure.

Though the sudden influx of so many visitors somewhat disturbed the even tenor of the Hotel Radisson's daily schedule, a good-sized crowd had gathered in the parlor floor banquet hall by 10:30 Tuesday morning. Most of the manufacturers' exhibits, all but two of which were on the fourth floor, had been installed a day or two in advance, so the setting for the big show was ready.

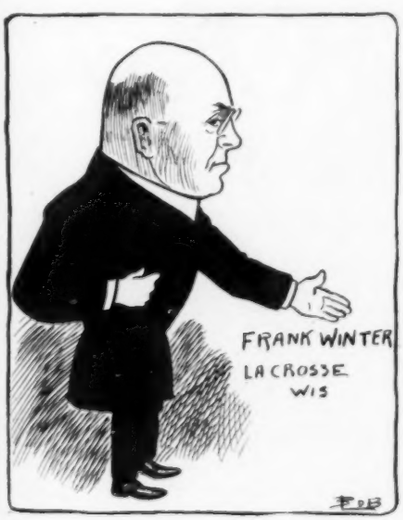
In the convention hall President E. B. Fisher occupied the chair. When he had called the meeting to order, and the Rev. Dr. John E. Bushnell, of Westminster Presbyterian Church, had invoked the divine blessing, the president introduced Governor W. S. Hammond of Minnesota.

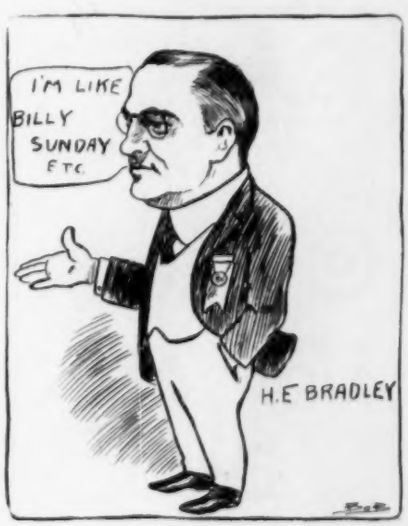
In his address of welcome the governor made competition his keynote. He explained the meaning of the comparatively new term "competitive tariff," which he favored, expressed himself strongly for competition in general, and said he had broken his rule of staying in his office during business hours by attending this meeting because it was a meeting of men who stood for competition.

President Fisher then introduced Mayor Wallace G. Nye, of Minneapolis, who extended a characteristic welcome to the delegation. He spoke of the value of organized effort, calling his own city an excellent example. Sixty years ago the site of Minneapolis was an Indian Reservation; today it has in full and overflowing measure all the advantages modern civilization can offer. Only organized effort, he said, could accomplish that.

Harold L. Beyer, of Grinnell, Ia., made formal response to the double address of welcome. He explained the removal of the convention from Chicago and expressed the peculiar fitness of Minneapolis as its holding place. Not only is it a splendid city, but in it operates the second largest, if not the largest, independent telephone company in the United States —a company that has done yeoman service in the cause. He pointed out the great work the independents had done in establishing the telephone as a utility for the people, and the dependence of that work upon local pride and local capital. But there had been all along, he said, a lack of cohesion and organization among them; they have been unable to put their case well before the public. He emphasized the extreme importance of neglecting no longer the matter of intelligent publicity. The opposition, he pointed out, was thoroughly familiar with the value of publicity and used it freely. Inform the newspaper reading public, he urged, of the work the independents have done and are doing.

When Mr. Beyer had closed, Mr. Fisher delivered the president's annual address. He paid personal tribute to Minneapolis and the country round about it, with which, he said, he was very familiar. He passed as lightly as possible over the condition in Europe and the part the telephone plays in it, and drew a lesson from the fact that those who are fighting over there all, doubtless, are earnest in their convictions and believe they are right. Passing to the subject of telephone investments, he quoted the financial department of the *Review of Reviews* in support of public utility, and especially telephone securities, showing that these forms of investment are at last getting proper recognition. Going over the work of the association, he mentioned the termination of the Pacific coast case, and the bearing that decision should have on subsequent conditions. He reviewed briefly the consideration given to the qualified toll line contract proposed by the Bell Company—a question not





Second Annual Convention of the Independent Telephone Association of America Held at Hotel Radisson, Minneapolis, Minn.

yet settled. He mentioned also the desire of the old National Association to "get together" with the new body, but admitted that he saw little immediate hope of such an amalgamation. He quoted the figures of $1,500,000 to $1,800,000 as the amount of the war tax to be collected on telephone messages by the government this year, which large sum will be paid by the public, as it should be, instead of by the companies. In attaining this arrangement the association did its share of work, which to the members should have been worth their dues if nothing else were accomplished. The secretary of the association has conducted schools of operating in different states, as a direct result of which operating companies have been able materially to increase their revenues. The three books of operating rules published by the association, on magneto, common battery, and toll operating, have helped wonderfully in standardizing independent practice, and consequently saving calls and increasing business. The association also publishes a bulletin for the purpose of keeping companies in various parts of the country acquainted with each other's activities. He mentioned the success of the Ohio convention and the Ohio State Telephone Company, and the fact that the Ohio independents had gained business even during those several years of waiting. Ohio already has more independent telephones in service than the total number of instruments in the United States before competition entered. He praised also the recent meetings in Kansas and New York state, and said he was assured that the independents of Illinois were more zealous and more thoroughly united today than they have been for years. Mr. Fisher spoke of the Bell purchase and merger situation, warning his hearers that where the Bell Company desired to abandon a local territory, its object was to eliminate the competitive condition, so that it could then take any steps it desired to absorb the independent. He quoted the Michigan Commission as saying there should be but one telephone service, the paramount company being the survivor in each case. An old but always interesting point was brought out in the matter of community discrimination. State Commission laws do not allow a telephone company to discriminate in its rates between different portions in the same community; but apparently there is no law or rule applying to the numerous cases where a company charges high rates in one town and low rates in another, thus fighting competition at one point at the expense of another point served under monopoly.

The noon hour having arrived, C. B. Randall of St. Paul suggested the postponement of Secretary Vivian's report until the afternoon session, and that committees be appointed at once. Accordingly President Fisher appointed as a Committee on Finance Messrs. G. W. Robinson, Minnesota; E. D. Schade, Pennsylvania; H. Linton Reber, St. Louis, chairman; B. G. Hubbell, New York; and Walter J. Uhl, Indiana.

The Nominating Committee was composed of Messrs. Albert Parlette, Tennessee; H. E. Bradley, Pennsylvania; E. Darcey, Indiana; Q. F. Clark, Minnesota; and C. L. Ovitt, Vermont.

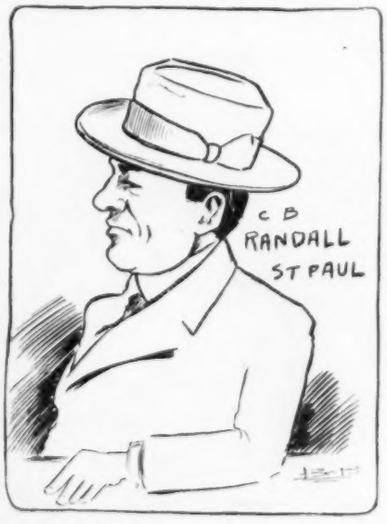
Adjournment was then taken until 2 p. m.

TUESDAY AFTERNOON SESSION

After seeing a motion picture entitled "The Reformation of Ham" projected in the convention hall, the meeting listened with rapt attention to C. B. Randall on "Present Tactics of the Opposition." To afford contrast, Mr. Randall harked back to the famous Whitney letter of 1907, quoting from it to some length. He commented on the new Bell attitude toward monopoly, and its advertised claims that it is not monopolistic. He declared that the Bell Company has shown no intention of complying with its own promises in the Kingsbury letter of December 19, 1913. He stigmatized the toll connection contract, in its latest form, as discriminating in that the public would be penalized ten cents for the use of the Bell lines, while the independent lines were allowed to fall into disuse. He regarded this as a shrewd move by the Bell to forestall any attempts of the state to enforce equitable connection. The Bell, he said, quite plainly still retained its old dream of monopoly, and the independents should be on their guard constantly and maintain their organizations in readiness for any differences.

President Fisher named as the Resolutions Committee Messrs. D. M. Neill, Minnesota; F. S. Miller, Oklahoma; W. J. Uhl, Indiana; W. G. Underwood, Pennsylvania; and E. L. Barber, Illinois.

"Basis for Determining Proper Switching Charges



for Farmers' Lines" was a valuable paper prepared by Secretary Lewis E. Gettle of the Wisconsin Railroad Commission, with the assistance of Engineer Mc-

Wethy and Statistician Mathews, and read by Mr. Gettle. It will be published later.

L. L. Hill, of the Page & Hill Company, gave an illustrated talk on "Poles." Views of the fiber of the cedars and other woods were especially interesting.

"Some Do's and Some Dont's of Telephone Advertising," a splendid paper by General Manager Thomas W. Hicks of the Adsit General Electric Company, was read by Prof. Martin of Minnesota University because of Mr. Hicks' illness. It was well illustrated, and will appear in these pages later.

Secretary W. S. Vivian here presented his report, an abstract of which follows:

The Independent Telephone Associatiion of America was organized on October 18, 1913.

The first important activity of the association was the assistance given the Federal government in the "Portland case," hearings on which were held throughout the country. Witnesses were secured who assisted in this case at their own volition and expense. The secretary stated that it was probably due to this effort of the association that the government secured a decree in 1914.

The Interstate Commerce Commission also about this time proceeded with a thorough investigation of the telephone situation. The association immediately prepared printed forms which were sent to all independent companies requesting data to be compiled and placed at the disposal of the commission.

It was also stated that the Bell representatives attempted to assist many independent companies in making out these forms. The uniform appearance of these forms was probably the incentive.

The association held a very successful convention on January 6, 7 and 8, 1914. During the year twenty-five conferences have been held on subjects of vital interest to the members. From many of these papers the Interstate Commerce Commission adopted extracts for its book of instructions.

After considerable effort the association was able to publish a comprehensive set of local operating instructions for both magneto and common battery exchanges. The orders which the association has received is evidence of the value of these publications.

Further, eleven operators' schools have been held with an attendance of nearly 900 operators from 400 various exchanges. Three schools are being arranged for the month of February.

The war tax was amended due to the influence of the association, so as to require telephone companies to collect a tax of one cent on every message of 15 cents or more. Mr. Vivian stated that this expense alone saved for telephone companies was much in excess of the maintaining of the association.

The association has been represented in twelve official conventions and has sent out approximately 30,000 pieces of first-class mail.

Copies of *Association News* were distributed to member companies each month, showing reproductions from newspapers giving the general conditions of the telephone industry.

Mr. Vivian commented emphatically on the real work being done by the service department under the management of Frank L. Eldridge, stating that this department had received, answered and indexed nearly 400 inquiries covering almost every phase of the telephone business.

The total income, paid or unpaid, amounted to a little more than $18,000—$6,630 or 36 per cent came from eighteen Independent telephone manufacturers and supply dealers. Nine thousand, one hundred forty-one dollars, or 50 per cent, came from thirty-one Independent telephone companies, exclusive of membership dues, which amounted to $2,175, including current dues as of December 31, 1914.

The organization has 302 companies as members, these companies operating nearly 750,000 telephones, 150,000 circuit miles of toll line and securities at naerly $100,000,000.

Secretary Vivian stated that what has been accomplished

would not have been possible except for the unselfish and untiring co-operation of the elective officers and directors of the association, who have given their time and money unstintedly wherever the interests of Independent telephony and the association demanded. Theirs has been a service that cannot be measured in dollars and cents.

The books of the association having been audited by John W. Coffey of the Coffey System and Audit Company, Indianapolis, and A. C. Cragg, auditor of the Tri-State Company, they now reported the books to be in a splendid condition. Secretary Vivian read a telegram of regret from Richard Valentine of Janesville, Wis., who was kept away by illness. A resolution from the Western Pennsylvania Independent Telephone Association urging the merger of the two national bodies was referred to the resolutions committee upon the motion of H. L. Beyer. It was announced that Wednesday morning would be given over to the manufacturers' exhibit, a description of which will be found on another page.

Adjournment was then taken until 2 p. m. Wednesday.

WEDNESDAY AFTERNOON SESSION.

"Ham, the Lineman," was the motion picture which preluded the Wednesday afternoon session. The Rev. Mr. Bacon, pastor of the Park Avenue Congregational Church, invoked the divine blessing upon the session.

Professor George D. Shepardson, of the chair of electrical engineering at Minnesota University, presented an extremely interesting paper entitled, "Some Applications of Theory to Telephony." This will be published in a later issue.

The subject, "Our Association," was given by D. M. Neill in the absence of J. C. Casler to whom it had been assigned. He developed an exceedingly interesting and inspiring address.

"Operating Responsibility," by H. D. Currier, chief engineer of the Kellogg Switchboard and Supply Company, advocated the formation of a standardization committee. A. J. Shands of St. Louis immediately moved that such a committee be appointed from operating members of the association; which motion was seconded and carried. Mr. Currier's paper, which was praised by President Fisher, will appear in a later number of this paper.

After Albert Parlett of Tennessee had presented the report of the nominating committee, F. H. Williams of the White Company was introduced and entertained the meeting, with views of White motor trucks and cars in telephone service.

The subject of amalgamation of the two associations arose and C. B. Randall moved that the present committee in charge of that question be retained whether the administration of the association changed or not, which was seconded and carried. Mr. Randall then told of the committee negotiations with the American Telephone and Telegraph Company in drawing up an acceptable contract form, and the concessions made by that company. Of the tentative long lines contract submitted by Vice-President Kingsbury a week previously, Mr. Randall expressed his belief that when it should have been accepted by the A. T. & T. directors and subsidiary companies nothing could be gained by further negotiations.

W. J. Uhl then introduced a motion in the following form:

As it appears to us, from the report of the committee on qualified toll line contract, that the American Telephone & Telegraph Company now offers, subject to the approval of its board of directors and of its subsidiary companies, a contract for connection with the Bell toll lines changed somewhat from the first form submitted, some of the principle changes being to-wit:

1. Five cents to be paid the subscribing company for each originated message as compensation for the use of terminal facilities.

2. A terminal fee to the subscribing company on each terminated message.

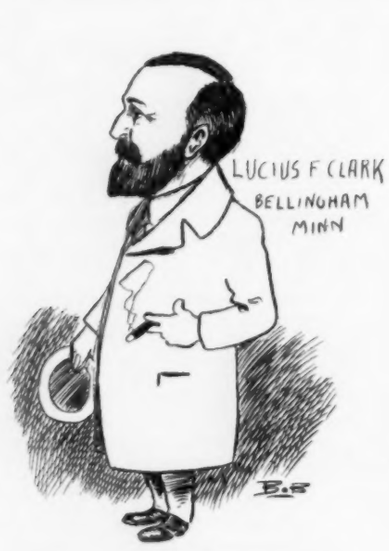
3. The option of signing a contract for a period of two years for long lines business only.

I think no definite action thereupon can be taken by this association until notified that the proposed contract and changes have been approved by the A. T. & T. directors and subsidiary companies, but our directors ought to know how we members feel about the matter.

Now I move as follows:

1. That we believe a contract for two years on the long lines business is not sufficiently long considering the expense of establishing the necessary connections and that such period should be extended to a period of five years at the subscribing company's option.

2. That it is the sense of this meeting that in the event the board of directors of this association receives advice from the American Telephone & Telegraph Company of its unqualified offer of a contract substantially as has been outlined, that we believe the board of directors has secured all the concessions



and changes which may be hoped for by negotiations with the Bell company and that the board be instructed that it need not continue such negotiations any longer.

The session was adjourned after viewing a motion picture entitled "The Way of a Woman," in which was featured Miss Irene Estelle Hough, the Omaha operator selected by the motion picture company as the prettiest operator.

THE ANNUAL BANQUET.

At seven o'clock Wednesday evening some two hundred guests assembled in the parlor floor banquet hall of the Hotel Radisson for the association's second annual banquet. While the banqueters dined they were entertained by the Tri-State Orchestra, the Tri-State Ladies' Chorus, and Miss Margary Brown, soloist. "The Little Independents Ambled Right Along," sung by Mr. Roll and written by Mr. Curtis of the Tri-State Company, made a great hit.

The intellectual treat of the event was the delivery by Dr. George E. Vincent, president of Minnesota University, of a splendid address on "The Organization of the Social Mind." As a public speaker Dr. Vincent has few equals, and his fame is at least national. He held his audience breathless until the close of the program; and President Fisher said it was the best banquet he had ever attended.

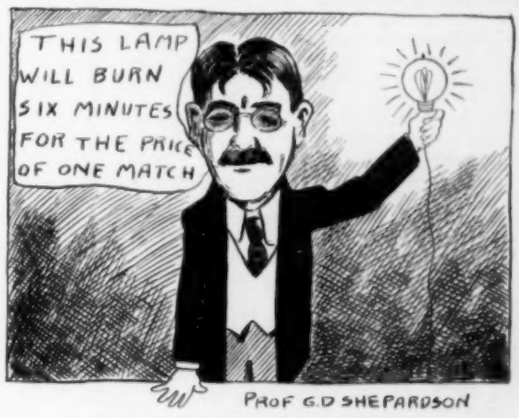
THURSDAY MORNING SESSION.

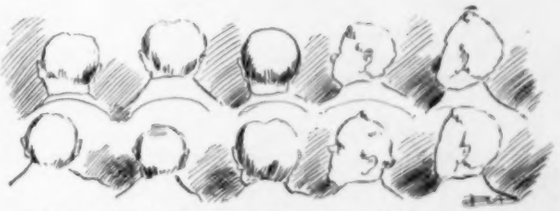
Rev. Stanley B. Roberts of Bethlehem Presbyterian Church made the invocation which opened the Thursday morning session. The subject of "Accounting" was treated by J. N. Van Sant of the Interstate Commerce Commission. He suggested that the association have a representative at the public hearing to be held by the commission in Washington, March 4, when the system of accounting promulgated by the Interstate Commerce

Commission and by the various state commissions will be discussed. H. L. Beyer, Iowa, moved that the secretary be directed to get authorizations for the directors to appoint such a delegate.

Frank Winter, La Crosse, Wis., next delivered a very interesting address on the subject of "Physical Connection." Because of the importance of this subject and of Mr. Winter's treatment of it, this paper will be published in an early issue.

"Financial Organization" was the title of a paper by J. C. Kelsey, which aroused a great deal of interest. It proposed a plan for a financial corporation to handle in-





dependent telephone financing—something that has long been needed.

The result of the election of officers was next reported, and was as follows:

President, E. B. Fisher, Grand Rapids, Mich.

Vice-President, E. D. Schade, Johnstown, Pa.

Second Vice-President, W. H. Bryant, Mobile, Ala.

Directors, H. L. Beyer, Grinnell, Iowa; T. J. Shuflin, Butler, Pa.; L. A. Herrick, Freeport, Ill.; H. Linton Reber, St. Louis, Mo.; E. M. Prisk, Hazelton, Pa., and G. W. Robinson, St. Paul, Minn.

"Cross Purposes," was the last talk on the program. H. E. Bradley of Philadelphia gave it, and in it he recognized the power of the Bell organization as lying in the perfect co-operation of all its departments. In order to win permanent success the independents must give each other just as thorough co-operation.

The resolutions committee reported with the following resolutions, all of which were adopted:

Be it Resolved, That we re-affirm the principles of Independent telephony as endorsed heretofore by this association and to commend our officers and directors for their zeal and strict adherence thereto.

Be it Resolved, That the thanks of this association be extended to the manufacturers for their hearty co-operation and support, and particularly for their excellent exhibits, and that we express to them our need for their continued moral and financial support; and

Be it Further Resolved, That a copy of this resolution be forwarded to each of the manufacturers in attendance at this convention.

Whereas, The public press of Minneapolis and Saint Paul have been particularly gracious to this association in its publication of its proceedings, thus extending to the public a knowledge of what the association stands for and what it hopes to accomplish,

Be it Resolved, That the appreciation of this convention be

extended to each member of the Minneapolis and Saint Paul press.

Be it Resolved, That we extend our thanks to all independent telephone journals who have assisted us, and particularly express to them the need and the desire of this association for their continued support, and request that it be extended to us in the future.

Whereas, The management of the Radisson Hotel has exerted its every effort to make this convention a success, and has donated to the association largely of its equipment and the assistance of its employes, which assistance so tendered by the Radisson Hotel and its management has in a great measure contributed to the success of this convention;

Be it Resolved, That we extend to the hotel and its employes our unqualified appreciation of the courtesies and facilities extended, and that a copy of this resolution be taken from the records of the association and delivered to the hotel management.

Resolved, That the Independent Telephone Association of America accept the invitation of the Panama Pacific Exposition and the independent telephone companies of the Pacific Coast to hold an adjourned or special meeting of the association at San Francisco, at such time, during the period of the exposition, as may be deemed best by the officers and directors of this association, who shall have full power to act in the matter.

Be it Resolved, That we extend the thanks of this association to President Vincent of the University of Minnesota for his excellent and entertaining address. To the Tri-State Orchestra and Chorus, and to the individual musicians who have contributed such enjoyable features to the entertainment of the delegates, and to extend the hope that we may at some future time have the pleasure of again being entertained by them.

Whereas, The Interstate Commerce Commission, under authority of the act to regulate commerce and acts supplementary thereto, prescribed and issued uniform systems of accounting for telephone companies; and

Whereas, The several state commissions have prescribed and issued systems of accounts for telephone companies, in instances, different in form and effective on different dates, such actions creating confusion and resulting in unreasonable and unnecessary expense to the carriers; and

Whereas, The act provides that it shall be unlawful for any such common carrier to keep any other accounts, records and memoranda than those prescribed or approved by the Interstate Commerce Commission.

Be it Resolved, By this Independent Telephone Association of America, in convention assembled:

That the Interstate Commerce Commission be requested to assume and exercise entire control and jurisdiction over the accounting of common carriers subject to its jurisdiction; and

Be it Resolved, That the various states be requested to so change their laws as to preclude the state commissions from requiring any reports, the substance of which cannot readily be ascertained from the books and records required to be kept by the Interstate Commerce Commission; and

Be it further Resolved, That this resolution be spread upon the minutes of this convention and that the secretary be instructed to cause the same to be filed with the secretary of the Interstate Commerce Commission.

President Fisher appointed a committee of W. S. Vivian, E. D. Schade and H. L. Beyer to work with J. C. Kelsey and H. H. Knipe in organizing a financial corporation as suggested in Mr. Kelsey's paper. After hearing a short talk on Dr. Cushman's telephone of 1851, by Mrs. Cushman, the convention was adjourned.

Thursday afternoon Prof. Shepardson made a special demonstration to about fifty telephone men in the university laboratories. The magnetic field around wires, induced currents, capacity, transpositions, phantom circuits, harmonic ringing and other phenomena were shown experimentally.

Kellogg Has Permanent Exhibit Equipment

If a salesman wants to make the best impression on a prospective buyer, the surest, quickest and most satisfactory way is to show the goods themselves.

Photographs, blue-prints and bulletins, go a long way but when the buyer is actually allowed to examine the equipment himself he cannot help but feel enthusiastic if the apparatus is what he requires and is of known merit.

The importance of this feature of telephone sales has prompted the Kellogg Switchboard and Supply Company to have permanent exhibit equipment made up, consisting of samples of all standard Kellogg appartus.

This equipment was first shown to the telephone public several months ago at the convention in Columbus, Ohio.

It created a great sensation.

Scores of telephone men asserted that it was the most complete and attractive telephone display they had ever seen.

The group is made up of three standing panels of tube iron construction, the panels themselves being of special wood, covered with green burlap. One panel has magneto telephones of various styles, another has standard common battery instruments, and the third is what is termed a folding panel, and contains smaller apparatus parts such as coils, transmitters, receivers, etc., mounted on eight panels hinged to a center pole, the observer turning the "leaves" like a book.

In addition to the above display equipment, the Kellogg Company is sending to the more important conventions a demonstrating model automatic recall switchboard; the latest development in equipment for common battery towns. This board has automatic listening, automatic ringing, automatic peg count, instantaneous recall and disconnect, and secret service.

All of these features have changed the whole aspect of traffic conditions—fewer operators needed—instantaneous disconnect enables subscriber to get "central" on a "recall" immediately, just as if it were an initial call—secret service affording talking subscriber this advantage of a private line—automatic ringing so designed that the subscribers can hear, to their satisfaction, the party being rung—automatic peg count giving means of determining the average number of calls at each position.

Another very interesting novelty which is also used is a model of the immense new Kellogg factory. This model is about ten feet long and is illuminated from within. Tiny electric lights occupy points in the middle and two ends of the building, and a diminutive auto truck is seen in the foreground.

Texas Telephone Company Secures New Bond Issue

To secure a bond issue of $5,000,000 the Texas Telephone Company, with headquarters at Waco, has filed a mortgage on its entire assets at Fremont, Texas.

The mortgage was made in favor of the Commercial Trust Company of Kansas City. Two million dollars of the bonds are to be issued forthwith. The concern, which was incorporated last September, is contemplating extensive improvements on the Waco exchange and upon other exchanges in the state. This company was formed from the Brazos Valley Telephone Company and the South Texas Telephone Company, and includes all the branch lines of this company. It consolidates practically all of the independent telephone companies in the state.

The company has lines in thirty-four counties of the state as follows: Dallas, Hill, Bosque, Ellis, McLendon, Coryell, Falls, Bell, Williamson, Travis, Bastrop, Hays, Comal, Bexar, Washington, Waller, Grimes, Harris, Liberty, Jefferson, Orange, Limestone, Rusk, Cherokee, Nacogdoches Shelby, San Augustine, Angelina, Lee, Hardin, Jasper, Fayette, Tyler and Jefferson.

Telephone Talks

The Second Installment of an Instructive Serial Course for all Telephone Workers

BY G. W. CUMMINGS AND ARTHUR KNEISEL*

THE regular business of the Technical Club had been disposed of and all the members settled themselves into easy positions to enjoy the discussion hour of the meeting.

"At the last meeting," announced the President, "the Tester told us the progress of a case of trouble prior to its being given to a repairman to be cleared. Mr. Tester, please continue with your story."

"The Tester's work was practically completed with our last talk, so I will give out this case to the Repairman who objected to working overtime at the last meeting and let him tell us just how he would clear it. Here, Beam, take this one: John Doe, 1643 Blaknil—short to ground. Other party at 1601 Blaknil."

"All right, what are the conductors?" asked the Repairman.

"It takes 323 and 324 in cable 41, junction box in the alley north of Blaknil 1 pole west of Sixteenth."

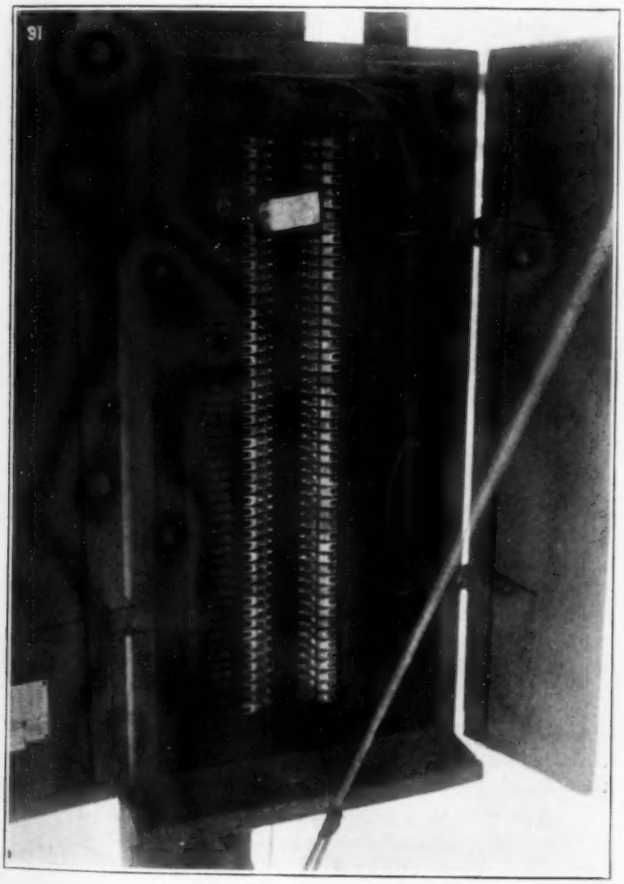


Fig. 4. Interior of Fifty Pair Junction Box.

"Here, Kid, you follow me and we will go to the junction box first and test to find which way the trouble shows. I wish the company would nail butt-steps on all the cable poles so we wouldn't need spurs on them. I have shot trouble in cities in the South where every pole was butt-stepped and we had very little trouble with kids climbing poles after the first

Fig. 5. Test Set With Condenser and Push Button for Signalling.

three or four weeks of use, and I don't think the boys down there are any better than the boys here, and it was a criminal offense for a telephone man to wear spurs. By the way, they seldom found spur holes in the cable sheathes there.

"Here is a picture (Fig. 4) of a junction box which shows just how the cable from the office comes in at the center of the bottom and is fanned out and soldered to the clips at the front of the box. One end of the tubular fuse is screwed into a clip at the back while its other end is fastened to the U-shaped clip at the front by means of the nut on the fuse. The back clip is connected to a binding post to which are fastened either the drop-wires or the aerial cable wires which enter the box at the sides."

"What is the object of the junction box?" asked the Installer's Helper. "Why don't they run the wire direct from the exchange, underground to the pole on which the last cable box is hung?"

"The principal object of the junction box is to protect the underground or unexposed part of the cable plant from damage in case of a high tension cross on the aerial cable or drop wires. The 7-ampere

*Copyright, 1915, by G. W. Cummings and Arthur Kneisel.

fuse in the junction box is supposed to melt and break the circuit, if the line connected through it becomes crossed with a high voltage wire, before the underground cable conductors are damaged. If this fuse were installed only in the aerial head, the underground cable would not be protected from a cross between the

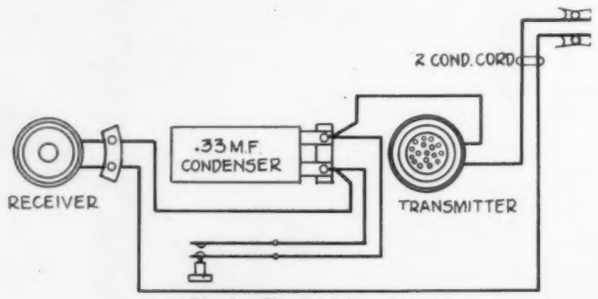


Fig. 6. Circuit of Test Set.

aerial cable and a high voltage wire. The junction box furnishes a good place for testing and makes the cable system much more flexible.

"Aerial cable has several advantages over underground cable in territory in which changes are apt to be made frequently; it costs less to install, to extend or to increase as the territory grows, and while it is not so secure from mechanical injury as underground, still it costs less to maintain than open wire. With fuses at the junction box and also at the subscriber's premises, it is unnecessary to install them at the aerial head and consequently this can be made smaller and neater than the junction box.

"Returning to the case of trouble in hand, to test this we must first find the correct conductors. This box counts from 301 to 400, according to its marking, so we will try fuses 23 and 24 for ground, but to make this test we must find a fuse with 'juice' or live battery on it. The sheath of the cable is always grounded

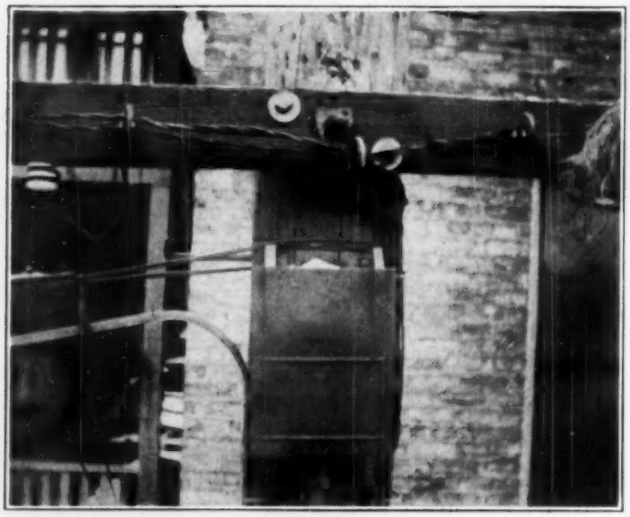


Fig. 7. Exterior View of Aerial Cable Terminal.

so we will touch one clip of the test set in contact with the cable sheath and touch the other clip of the test set on fuses until we get a click in the receiver, and then we will attach a test set clip to that fuse and touch the other clip on fuses 23 and 24. If we get a click each time, we are very apt to have the right line. This is the method of testing you will use when you begin to 'shoot' trouble; later you will bridge your test set across the fuses you are looking for and judge from the sound whether you are on a grounded line or not. We will open this line by removing the fuses, unscrewing the nut at the front with a socket-wrench and then turning the fuse to the left. You probably think it foolish to carry a socket-wrench in your kit, but grim experience in the shape of a ten-day lay-off for breaking fuse springs in loosening fuses with a piar of 8-inch pliers taught me the wisdom of the company's order relating to the use of socket-wrenches shortly after I started in the game. Never use a pair of pliers on the front end of a fuse in unscrewing it or you may damage its threads or its fuse and then your line will come in trouble as a loose connection

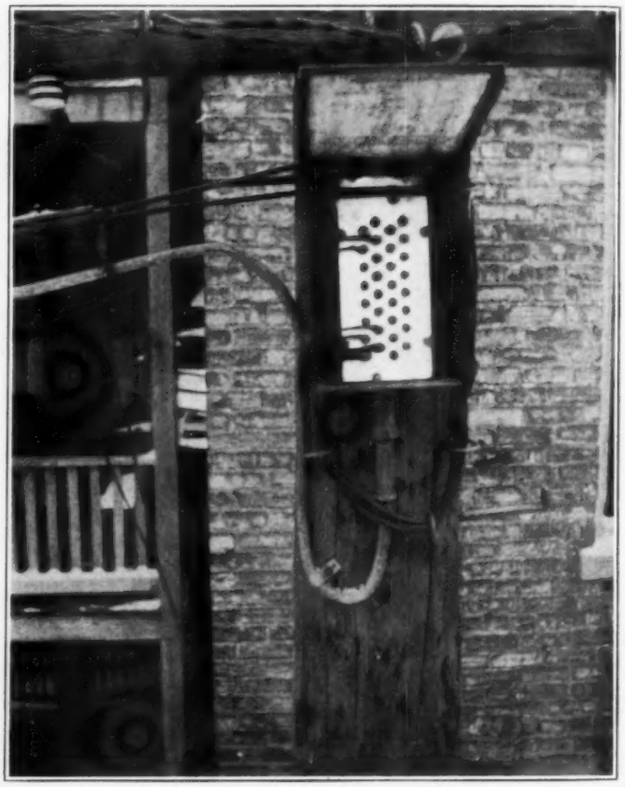


Fig. 8. Interior View of Cable Terminal Shown in Fig. 7.

noise. If you do not partially unscrew the fuse before slipping it out of contact with the front spring, you may damage it or the clip into which it is screwed. By keeping one clip of the test set on live battery and putting the test set in series with first one spring and then the other of the two from which we have removed the fuses we can tell whether the line is grounded toward the instrument, for the line end is connected to these springs, and if we get a click upon touching the test set clip to them, the ground is out from the cable."

"Now, how do you know that?" interrupted the Helper.

"Well, I know that one side of the office battery is connected to ground and the fuse to which I have connected my test set is connected to the other side of that battery, so that if I touch the other side of the test set on anything that is in electrical contact with

Mother Earth, I will close a path for battery to get back to that office ground and will get a click in the receiver due to the current flowing through it.

"Although the trouble tests 'out' in this case, we will test 'in' to be certain that the underground is clear. While we made the test 'out,' the hospital operator may have noticed that the line cleared and taken down the trouble cord. Whether she has or not, we can now bridge the test set across the fuse ends and raise the operator and when she answers we can verify the number of the line with her and we will also ask her to 'collect and return,' that is to throw coin operating battery out on the line. If the conductors are clear, we will hear nothing, but if there is even a slight ground, we will get the noise of this higher voltage breaking across the weak point. If the conductors are clear, the operator will report, 'no nickel signal,' and we will tell her to plug it up in the hospital and close the fuses back into their proper places, making sure that they are screwed home and the nut tightened properly."

"You used two terms there, I wish you would explain to me," interrupted the Helper. "They are 'bridge across' and 'in series.'"

"If you wish to get in series with a circuit, in testing, it is necessary to open that circuit and attach one clip of the test set on one end of the open and the other clip on the other end opened, while to bridge across it, we need not open the circuit but simply attach one clip to each side of the circuit. In the first case all of the battery flowing in the circuit flows through the test set, while in the latter case, only a portion flows through the set, or is shunted through it. 'Bridged across,' 'shunted through' and 'in multiple with' all signify the same."

"In the ordinary test set, are the receiver and transmitter connected in series or are they in multiple?" asked the Helper.

"They are in series. Here is a test set originally designed for automatic exchange office testing (Fig. 5), which makes a very good set for general repair work. First, being made of aluminum, it weighs about a pound less than our old standard test set; and second, it normally has a condenser in circuit so it can be used for listening in if the line is in use without giving the two talking subscribers a 'bat' in the ear. It is also useful in testing for a noise, for it will not signal the operator until the button is depressed. For repair work, the plug on this set is replaced by clips. This test set is wired as shown in Fig. 6. The receiver and transmitter are placed in series with each other so that the set will not draw so much current when it is bridged across a talking circuit and when wired in this manner a noise in the test set itself is caught quicker than when the transmitter and receiver are in multiple.

"One of the parties on our line," continued the Repairman, "is at the corner and drops off from this junction pole, so we will open the twisted pair drop wire from the binding posts common to the fuses at which we tested and test just as we did there. If this leg of the circuit is clear, we must go to the other party which drops from the aerial head. However, before we leave this junction box, let's take a look for any loose connections that can be picked up by a hasty inspection. There is no trouble so mean to find as a loose connection, and I never miss a chance to look for one and to fix it as soon as I find it. These fuses are particularly tricky and often a fuse which looked O. K. when put in service will show a loose connection after it has been in the weather for a short time.

"Ordinarily I would not test this case of trouble in this manner, but would go directly to the instruments. However, I will take you through a test in which all parts of the outside line are inspected."

Fig. 9. Twisted Drop Wire Entering House Through One Porcelain Tube.

"Wait a minute, Mr. Wisenheimer," broke in an installer who had up to this time listened as though bored to death. "Will you tell me why you would go to the instruments and not test as you have related? The few times I have helped on storm trouble I always found the trouble at the other end from which I began testing."

"Brains, sonny, brains—the only tools necessary in this work that you can't draw out of the stock room. In the first place, there has been no lightning recently that might have caused cable trouble, and second, there is no open uninsulated wire. Consequently the chances are in favor of the trouble being at the subscriber's premises. Probably some one has been monkeying with some of the equipment.

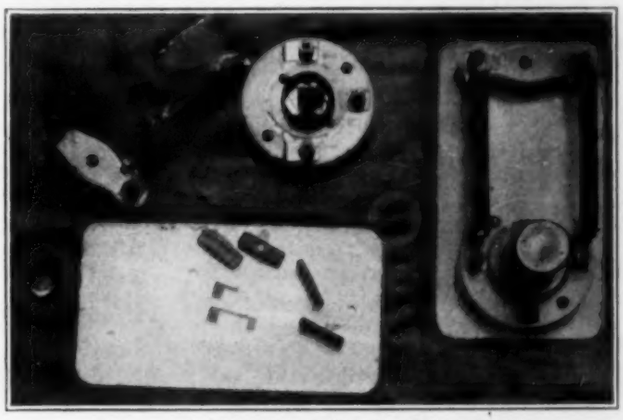


Fig. 10. Protector Parts and Protector Assembled.

"I have here two photographs (Figs. 7 and 8) which show a fifteen pair aerial head, sometimes called the 'Grace terminal' after its inventor, Mr. S. P. Grace. This view (Fig. 8) shows the interior of the head and

gives a very good idea how the drop wire runs direct from the cable binding posts through bridle rings to the double groove knob and from there to the protector inside the subscriber's premises. This terminal has the cable entering at the bottom, but later construction calls for the cable to enter the top of the box, and this method no doubt lessens cable maintenance by removing the bend of the cable from a point so convenient to workmen climbing the pole. This head is numbered from 11 to 42, so by bridging the test set across binding posts 23 and 24 we can verify our surmise that it is our line before we open it to test. This test is made just as we made the one at the junction box. As the cable shows clear, we will close down the drop wire on the proper binding posts, being sure to tighten all the nuts securely before closing the cover of the box. I wish to call your attention to the tying of the drop to the double groove knob. The two wires are separated and one is laid in each groove to prevent one wire pressing against the other at the point of suspension."

"Why is that necessary?" asked the Helper.

"This drop wire is copper-covered steel No. 17 B. & S. gauge; being only 0.0452 inches in diameter, it cuts through the rubber insulation very readily and therefore is apt to get crossed at a point of suspension."

"The drop wire is continuous from the cable terminal to the protector, so we need not look for the trouble there, particularly as it enters the building through a porcelain tube and has a good drip loop on the outside (Fig. 9.). Since the trouble on this line is reported as short to ground, it may get the ground at the carbons of the protector, and we will inspect these next. There, I thought so. Some bonehead has been working here and took out these carbons and then put them back without putting micas between them. Who worked on this line?"

"I did," replied an installer. "We put in a telephone at the other party and after I got my O. K. I sent my helper to this party to try the bell, for this party came in on the line while I was testing and asked me to come there to try the bell because it did not ring good. I thought that there was nothing wrong and that she had just got a few taps of the bell, so I just sent the kid over to get a ring on the bell to satisfy her, while I made out my report."

"I am the kid who was there," broke in the Helper, "and I'll tell you what happened. When I got there, I tried the bell and it rang all right. Then she insisted that I look at the protector because she happened to be near it during a storm and a lot of fire jumped out of it. So to satisfy her, I unscrewed the cap and took out the carbons and pretended to work on them. I just started to work and never saw the inside of a protector, but I did not want her to know that. What is the protector for, anyway?"

"Well, you sure will learn this work if you keep on investigating telephone apparatus on your own hook—if the company don't fire you before you learn a little about it," replied the Repairman. "The protector is intended to protect the instrument and the subscriber's premises from lightning or from high tension currents. Here is a view of a protector assembled and its various parts. It consists of two porcelain protector mountings with two fuses connected between them, all being mounted on an asbestos mat. The slots in the fuses should always be turned toward the mat so that if any of the fuse metal is thrown out through the slots, it will do no damage. The fuses are slotted to allow the air in them to expand when they blow. Removing the round brass cap from the protector and removing the carbons or protector blocks, as they are called, we see a heavy brass partition in the center with a lighter brass prong on each side. The partition is connected to the center binding post marked 'G,' and each of the two prongs is connected to a binding post on its side of the partition, marked 'I.' A grooved carbon block and a plain carbon block, with a mica between them are slipped between a prong and the partition so that the groove in the carbon is held by the prong. The mica, you will notice, is cut so as not to cover the entire surface between the carbons, and you will also notice that one of the two blocks has a small pellet of metal in the middle. The thin sheet of mica keeps the carbon blocks insulated from each other, and leaves an air space of .005 inch between the surface not covered by mica. If the line becomes crossed with a high voltage circuit, say, 500 volts or over, this current will arc across the air-space to the inner carbon and through the brass partition to its binding post, which is connected to ground. If the fuses of the protector fail to blow immediately, the metal pellet, which has a low melting point, will melt sufficiently to connect the two carbons and thus shunt the high tension current to ground until the fuses operate and open the circuit. The protector is connected so that the line first strikes the fuses before reaching the carbons, so that they can blow even though the carbons have grounded the circuit. Lightning is led to ground most easily by a direct path and it will jump the small air gap in preference to taking the path through the many turns on the coils of the instrument. Each time that lightning jumps across the air gap, it takes a little of the carbon with it. That is why the slots in the micas should always be down so that this little carbon dust can fall out instead of accumulating and causing trouble. Each time the carbons are inspected they should be cleaned by rubbing on a cloth and then by tapping to remove any loose carbon dust that may be on them. If they are burned too badly to clean by this method, they should be changed. The mica should be cleaned, too.

"After putting the protector in good order, we will test the coin box and the bell with the operator and report the line O. K. to the Wire Chief, and we will also make a note of the case in our memo book so we can recall the details of the case in the future if any discussion should arise concerning it."

"Mr. Helper, have these two evenings of discussion made the subject any clearer to you?" asked the President.

"Yes, I think I know just about how that case of trouble was handled, but there are so many terms that I must get before I see it as clearly as you do."

"We may put in an evening studying the language of the art," said the President, "but as our time is about used up, a motion to adjourn is in order."

Motion made, seconded and carried.

(To be continued.)

The American Telephone Company now owns 96.44 per cent of Western Electric stock. When Mr. Vail came to the presidency it owned but 80 per cent.

Automobile Equipment at Lima

Another Ohio City Cutover for Semi-Automatic

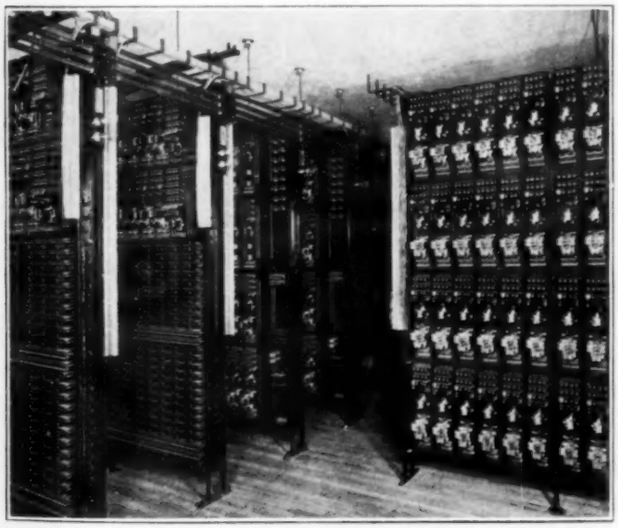
By Garrison Babcock

TO begin with, the "home industry" spirit of Lima, Ohio, is strong; secondly, the Lima Telephone and Telegraph Company has enjoyed the services of Lima's most representative business men on its directorate. That is one reason why the company is such an excellent example of telephone enterprise.

D. J. Cable, the president of the Lima Telephone and Telegraph Company, not only takes pride in this local enterprise, but has made himself an active element in Ohio state telephone matters from the beginning. With Mr. Cable, at Lima, are three other men whose ability has counted for much in the success of the company. They are George H. Metheany, general manager; John Falls, plant superintendent, and Gustav Hirsch, consulting engineer. Years of pleasant association have made these four men a unit of telephone management which moves business noiselessly and without deviation from the shortest route to success.

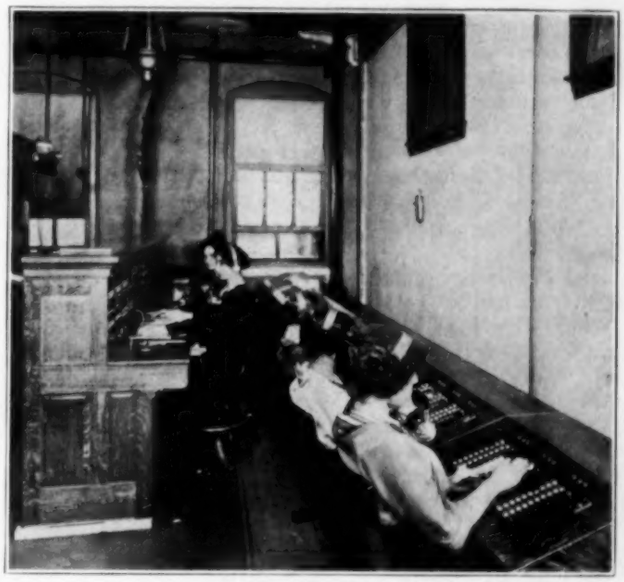
In 1912 the Lima Telephone and Telegraph Company negotiated the purchase of the Central Union Telephone Company's plant in Lima, which consisted of a new two-story exchange building, containing a ten thousand line capacity Western Electric switchboard, and a very complete outside plant with approximately two thousand local subscribers. In the adaptation of the Central Union plant to its use, the Lima company found that the newly acquired office quarters, and nearly every foot of cable and pole line, could be retained in the new layout, while the Central Office of the Lima company located in leased quarters had just reached its maximum capacity.

The fine new telephone building, erected by the Central Union a few years ago, was made adaptable by the addition of a third story, and the "Series B Automanual" system was purchased to complete the unification.



Switch Room Automanual at Lima, Ohio.

On the twelfth day of December, last, the automanual installation was completed, and the former Central Union subscribers were cut over by the "tooth-pick" method; and without losing a single call, the feat was concluded within twenty minutes, and those present who witnessed the event claim that it was the most successful cut-over ever undertaken by any operating company.



New Automanual Operating Room at Lima, Ohio.

The service to the two thousand Central Union subscribers, under manual conditions, had an average traffic of approximately five thousand calls per day, but the week following the cut-over proved a most remarkable change which can only be attributed to improved service through the Automanual system. The traffic developed an average daily load for the week, except Sunday, of twelve thousandcalls, and is steadily increasing.

Four thousand lines of Automanual Series "B" comprises this installation which will accommodate 2,000 former Central Union subscribers and 5,300 Lima Telephone and Telegraph Company's subscribers, which will be transferred to the Automanual exchange on February 6.

Tests of the service made on January 15, between the peak load hours of 8 and 10 o'clock a. m., consisting of over two hundred stop-watch observations, show an average answering and recall answering time of one and four-fifth seconds.

The operating schedule is to be based upon 750 calls per operator per hour, although the operators are capable of easily handling one thousand calls per hour.

The traffic load, after the Lima subscribers are connected to the Automanual, is expected to develop an average of over fifty thousand calls per day, and quite possibly as high as sixty thousand calls. If the popularity of the Automanual service is the cause of a corresponding increase in traffic, there can be little

complaint from the public as to the equity of an increase in rates.

Inasmuch as the makers of Automanual claim a life factor for their apparatus double that of Manual; and further, that the operating and maintenance cost are lower to the extent that the system will repay its original cost through economy, in from five to seven years, the remaining factor of popularity of service to the public, sufficiently great to substantiate a rate increase, will be watched with great interest by everyone connected with the industry.

During the past five years, the North Electric Company installed "Series A Automanual" plants at Ashtabula, Ohio, 3,000 subscribers; Warren, Ohio, 2,700 subscribers; Greensburg, Indiana, 3,000 subscribers; Galesburg, Illinois, 5,200 subscribers; Conneaut, Ohio, 3,000 subscribers and Hood River, Oregon, 1,200 subscribers.

These companies are eminently successful and all, with the exception of Galesburg, Illinois, and Warren, Ohio, have taken over the Bell subscribers, and at these points the number of Bell subscribers are greatly in the minority.

The principal advantage of the "Series B Automanual" lies in the fact that all common sources, such as impulse sending machines and common ringing interrupters, have been discarded for individual control devices for each trunk switch, and all automatic selections, such as calling line finders and selection to connect with the first idle operator, are performed by the instantaneous relay selection, which is an exclusive feature of the Telephone Improvement Company engineering.

The substation telephone is the common battery telephone and is connected to line and cut-off relays associated with multi-contact relay calling line finders, which connect the subscriber to the first selector and operator's key set trunks. The operators' key sets are arranged three per position, but in their selection for the idle operator it is only possible for a second call to appear on an operator's position when the preceding call has been answered by the operator. The key sets are arranged as a single large group and every subscriber has access to every key set.

Therefore, the longest waiting period for any call or recall is that time required of the operator to repeat and set up the number of the called for party of the preceding call.

As all inquiries are shifted by the local operator by pressing the "information button," this waiting time is rarely over two seconds and is the factor, coupled with the instantaneous relay selection, which enables the company to give its patrons less than two seconds' answering service. Comparatively inexperienced operators at Lima are now giving one and four-fifths answering time, and this average is expected to drop to one and one-half second after the subscribers and operators have used the new system a few months.

The operators' schedules are based upon each operator handling seven hundred and fifty calls per hour during the day period and in rush periods the operators easily reach the rate of eleven hundred calls per hour.

The simple "adding machine" method, instead of the complicated rules and cords, gives the operators a much appreciated relief with the new system, although they are completing several times as many calls with less than half of the subscriber delay that they were capable of doing under their former conditions.

The subscribers' call leaves the operators' position as soon as the first selector, second selector, ringing frequency selector and connector reach the point in their respective banks controlled by the depressed button, and this actuation takes place in less than three and one-half seconds, regardless of the fact that the location of the subscriber may be in a distant branch exchange.

All operating is confined to one point, as the distant exchange calls are connected over key set trunks at the rate of over three hundred per hour.

Upon the arrival of the connector contacts at the terminal of the called line, the "busy test" will be connected to the calling subscriber if the line "tests" busy, but if not the ringing, with the selected frequency, proceeds at once, giving the calling subscriber an "OK ring back" signal, continuing intermittently until the called party answers.

Upon completion of conversation, the act of placing the receiver on the switchboard causes all switches involved to restore. "Slow release" relays are provided in the circuit to prevent accidental disconnections, but this feature is so timed that no service delays occur in making recalls.

Some suggestion of "too fast" service was made before the Series B Automanual was installed at Lima, but as the operators are instructed to give the slow subscribers three seconds in which to respond to "number, please," before trunking the call to information, there is no room for this complaint and the thousands of quick-acting subscribers are not delayed by fixed line groups to operators or the occasional slow-acting subscriber.

The Telephone Improvement Company is now undergoing a process of reorganization and in this work the following personnel is actively engaged: Hon. James R. Garfield, Cleveland, Ohio; Hon. F. C. Stevens, Washington, D. C.; D. J. Cable, Lima, Ohio; A. M. Snyder, Cleveland, Ohio; J. M. Lenz, Chicago, Illinois; C. H. North, Cleveland, Ohio, and Garrison Babcock, Chicago, Illinois.

Independents Enjoin Michigan Commission

Injunction proceedings have been started by the Michigan Independent Telephone and Traffic Association against the Michigan Railroad Commission restraining the merger of the Three Rivers Telephone Company and other Michigan lines with the Heimbaugh lines, known as the Southern Michigan Telephone Company.

According to the petition, the Michigan State Telephone Company and the Southern Michigan Telephone Company filed an application for the right to exchange certain telephone properties. The Three Rivers Telephone Company asked permission to sell to the Southern Michigan Company.

The commission granted the petitions, and the complainant objected to the execution of the plans on the ground that it had leased the property of the Southern Michigan Company and was entitled to the use of its lines, as exchanges, etc.

The temporary injunction was one restraining the commission only.

Managements of the various interested companies met in Chicago where service could not be secured upon them and closed the deal. The Three Rivers Telephone Company then passed out of existence.

How Ohio State Company's Operators Work

What the Independent Girls are Doing in the Buckeye and Other States

Co-operation

By MARGARET FRANK, Long Distance Operator, Columbus.

CO-OPERATION and team work should be the main essentials in an operating room; without either we are unable to attain success. We find lack of co-operation in many offices, due to inefficiency.

To obtain good results an operator must be thoroughly alive to all rules and regulations. As supervisors are responsible for work done by the operator, it is absolutely necessary to have the operators' co-operation. The position of an operator is a very responsible one and should not be one of drudgery, as many are inclined to feel. Our work may be made a pleasure if we aim to be congenial, assist each other in every possible way, all working together for the same purpose—success.

Clara Fitzgibbons, Chief Operator, Lima, Ohio.

Katheryn Wellens, Chief Operator, Toledo, Ohio.

Co-operation should not be confined to any one office but should exist between other offices which will help to lighten our own work. This can be brought about by answering stations and clearing circuits promptly, giving close attention to through calls and watching N. C. tickets. The result will mean better service, operating conditions and increased traffic.

We occasionally find those operators who neglect a through N. C. ticket and feel that it is more important to rush up their own tickets while the other station is probably having difficulty to keep her subscriber in good humor, promising him a report in "just a minute," which sometimes ends in 30 or 40 minutes—perhaps an hour.

Many are inclined to think that speed alone is the most important factor in the operating room, but accuracy must also be considered. After a subscriber is connected with the party he desires to communicate with, the operator should give enough attention to know just the kind of service her patron is receiving. I do not think it necessary to delay a call by supervising any one call in particular. If there is difficulty in hearing, the call should be referred to one who is better able to handle it without interruption. It should not be necessary to have some one remind you repeatedly what is expected of you. With a little assistance on the part of others at the proper time we may be able to accomplish much. We can assist each other in many ways, especially by helping those who lack experience, and there should never be any indication of displeasure when called upon to do so.

We have in our office corrected directories, which every operator should refer to before listing a call "NL." Much time would be saved if each one would bear this in mind. I can safely say that an average of five or six such calls are referred to me each day, partly by reason of the fact that the operators are very hasty in referring "DA" calls, and about one-half such calls referred I am able to get with the first ring. My idea is for an operator to hold such a call long enough to be able to change cords, reassign trunks and then if unable to get a response, refer to her supervisor. This would save much delay and unnecessary work and at the same time promote rapid service.

There are many advantages found in a larger office that do not exist in a smaller one. Operators receive better coaching, are constantly given necessary attention—hence more is expected of them, followed with good results.

Our work may

Nellie F. Sweeney, Chief Operator, Columbus, Ohio.

Edith Swartzel, Chief Operator, Dayton, Ohio.

be considered educational in many respects. We are taught the location of towns and cities that perhaps would be unknown to us. We converse with intelligent people; we become familiar with current events and are kept in close touch with important affairs.

There is chance for some improvement in all. Let us all make every effort possible to have the coming year the most successful one in our history. Let your slogan be "Do it now."

A Chief Operator's Experience

By Nelle F. Sweeney, Columbus.

MY first experience in telephone work was with the Bell Telephone Company. As a local operator, I worked relief hours for eight months, hours from 5 to 10 p. m. After I served eight months on these hours, I was placed as a day operator, which hours I filled for six months. I was then transferred to long distance operating, both Central Union and A. T. & T. lines. At that time there was no one to coach the operator. They had to study out the board and lines as best they could.

My first Sunday to work, which was two weeks after taking long distance, was one I shall never forget, for I was alone on the board and my experience of two weeks did not amount to very much. I had quite a few appointments over the A. T. & T. lines, for at that time we gave night rates. Not being familiar with the routings I was at loss to pass and O. K. my appointments, but I asked co-operation from operators along the line and finally after some delay was able to complete my calls. My first Sunday alone gave me more experience and encouragement than the two weeks before.

This work I continued for one year. In May, 1900, I left the Bell Telephone Company to accept a position with the Citizens' Telephone Company. I worked one-half day on the local board and was then transferred to the long distance as operator, filling this position for just a short time, when I was asked to take care of the toll room.

At this time we had just two long distance lines and operated a manual board. Nine years ago our company installed the automatic. We have 14,900 subscribers, 61 long distance lines, 10 phantom circuits, 25 of which are operated both automatic and manual, making a total of 96 lines. We have 20-line positions, 4 recording, 2 information, 2 pay station and 2 rural positions—also 3 transfer positions, which take care of all traffic between long distance and our subscribers, trouble clerks and wire chiefs.

I have had very trying days and also very pleasant ones. Always welcome a complaint from a subscriber or station and hold such complaints on file until I find they are satisfied. We have less complaints now than at any time. Why? We are getting co-operation along the lines, having meetings among our operating force, making them feel they are part of the company, and from these meetings and co-operation we find wonderful results in our office.

I trust that every chief operator's experience has been as pleasant as mine.

Suggestion From a Pay Station Operator

By Eva Able, Neil House, Columbus.

IN each of our capacities as operators, our general experiences have taught us, if we have the general welfare of our company at heart, we are able to expand our prestige by kind, courteous and ladylike service and thus cause our company to be the company in the minds of all local and traveling patrons. Where the best, quickest and most courteous service is rendered, an operator coming face to face with all classes of humanity is certainly placed in many instances in very trying conditions. But, before condemning the one in question, we should display a more extended conception of the subject and render our service accordingly. However, on the other hand, I do not feel we should be called upon to withstand abuses. It reminds me of a story which I feel is very opportune at this time.

It is told of an Irish woman at religious prayer meeting that, after listening to the many experiences in religion of her numerous brothers and sisters in church, she arose and said: "Dear brethren and sisters—I have been listening to youse telling of your own happiness and such and quoting the many passages of scriptures, but there has been none of you repeated my favorite passage, the one that does me old heart the most good is when it says in the old Good Book "Grin and bear it." That is what we operators are called upon to do, just grin and bear it.

Now as to my personal suggestions, to render our service to the public in a more satisfactory manner, I mention the following:

First, I feel the most important improvement would be to thoroughly impress on the mind of the operator receiving the call the necessity of repeating it back to the operator giving it, so as to have positive knowledge the call was received correctly, thus avoiding the loss of time by the operator giving the call not knowing it was received O. K.

Second, that the operators come in on the line at the close of the message and check time at once; by so doing lines are more quickly opened for pending calls.

Third, that long distance operators should be prompt in giving reports on all delayed calls.

Fourth, public pay station operators should be very careful in their duties so that proper instructions may be left in the proper place for the person to answer his call.

Fifth, we pay station operators find that since our company has installed automatic service between large cities, oftentimes our lines are used in preference to the competitive lines, as we render quicker service.

Complying with the foregoing suggestions, satisfactory results will surely follow.

Exchanging Ideas Among Operators

By Katheryn Wellens, Toledo.

MY telephone experience started about eight years ago, when I accepted a position with the A. T. & T. Company, Toledo, Ohio. I was with that company for a period of five years. In the fall of 1911 I left for a short visit in the state of Oklahoma. After my arrival there I decided to remain permanently, and was offered a position with the Pioneer Telephone Company, which I accepted. I was connected with this company for a period of about one year, when I was called home on account of the illness of my mother. I decided then to leave the telephone field and take up office work. During the time I was doing office work I kept longing for the dear old toll lines, which sounded like music to my ear. In the fall of 1913 I was located by B. O. Likens, manager of the Ohio State Telephone Company, who offered me a position as chief operator in Toledo, which I am filling at the present time.

When I first started in the independent field it

seemed quite difficult to get used to the manner of handling calls, the rules being somewhat different from the A. T. & T. rules. I have been connected with the Ohio State Telephone Company one year, and am very well satisfied with my present position and the company's manner of doing business. I believe we have in Toledo a live and up-to-date exchange.

I have enjoyed both the schools in Indiana and Michigan, and have profited by them, as I have exchanged ideas with other chief operators. Attending these meetings is not only beneficial from an operating standpoint; the meeting of the different chief operators personally should in no wise be overlooked, as it surely smooths over ragged edges. I know of no business where meeting people personally does as much good as the telephone business. I am looking forward to the time when we in Ohio, and especially in Toledo, can extend our invitation to the various stations in Ohio, and also to other states, to attend our meetings.

Dayton Chief Operator Favors Schools

EDITH SWARTZEL, chief operator of the long distance division of the Ohio State Telephone Company, Dayton, Ohio, has been associated with the company since November, 1914, being line operator for two years, supervisor one year, and chief operator the past year.

Miss Swartzel states there are thirty-five toll lines terminating on the Dayton toll board, a number of which are automatic and manual combination lines.

Richmond, Indiana, located about forty miles west of Dayton, has an automatic telephone exchange. Connection between subscribers of one city and the other are made direct by the automatic calling devices. Columbus, Ohio, located seventy miles east of Dayton, is handled by the same method.

Springfield, Piqua, Troy, Miamisburg, Centerville, West Carrollton and Sulphur Grove, Ohio, are manual exchanges equipped with automatic calling devices and connections are made direct with the Dayton subscribers.

Having attended the operators' school meetings recently held at Fort Wayne, Indianapolis and Winchester, Indiana, Miss Swartzel appreciates very much the good things that were accomplished at these meetings. Not only getting acquainted with other exchange chief operators, with whom she handles many messages daily, but the general instructions, which Mr. Vivian of the Independent Association and others gave out, have been of great value to her in improving the operating conditions in the Dayton exchange.

Miss Swartzel is strongly in favor of the operators' school being held more frequently.

Importance of a Pleasant Voice

By Clara Fitzgibbons, Chief Operator, Lima.

MY experience as an operator started in the service for the Bell Telephone Company at Lima, Ohio. After working for two years as a local operator, I was promoted to night chief operator. It was while holding this position that I first gained some knowledge of toll work.

I held the position as night chief operator for one year. I then took up the long distance work, remaining in the service of the Bell Telephone Company for about two years.

A little later I applied for a position as long distance operator with what is now the Ohio State Telephone Company. After filling that position for two years, I was promoted to night chief operator. It was in May, 1909, that I accepted the position as chief operator of the Ohio State Telephone Company at Lima, Ohio, where I am at present employed.

The toll work has always appealed to me most for the reason that it gives one an opportunity of dealing with the public. This work is fast becoming a profession.

To me nothing is so important as a good voice. Operators too often make their work a daily grind by not trying to cultivate a pleasant voice. An operator who is courteous can very often force a subscriber to talk on a call when he is in the very act of cancelling it.

It quite frequently happens where the operator reports on a call she is unable to locate the party for want of better address. The subscriber later secures this information, but refrains from calling the operator because of the seemingly irritable tone of voice with which she first handled the call.

I think the operators' meeting one of the greatest means for bettering the service, for I find that you must keep them interested to get good results. This can be accomplished by these meetings.

The first school of instruction I ever attended was in Fort Wayne. It was there I realized the necessity of co-operation. I think these schools have greatly benefited us. The operators and chief operators become more broadminded and are filled with the spirit of co-operation.

Personal Responsibility

By M. Clark, Chief Operator, Paducah, Ky.

"IF we had our way there would be no errors." That's the condition which the world is striving for every day. Yet we know that mistakes are inseparable from human endeavor. There are mistakes made in every walk of life, from the lowest to the highest position occupied by man. But cannot these mistakes be lessened? I think they can. The secret of few errors in any line of work—and especially in telephone work—is "attention and self-watchfulness." The wandering mind should have no place in a telephone exchange. While we are doing the work for which we are paid, we should concentrate our minds upon that work, as though it was the most important work in the world.

Now, we earnestly desire that each operator will watch her own work, feel her responsibility for the class of service which she renders to the public, be her own critic, and if all this is done with the eyes well open and a sincere desire to accomplish the best results, you can prevent seventy-five per cent of the trouble and errors that load our service; but without personal responsibility this can not be done.

The eyes of the world may be upon you, or you may be under the best possible training, but that will not make for you a life worth while unless you, yourself, feel the responsibility. So let us adopt this motto, "Bear our own burdens."

Making the Best of things

By Mattie Austin, Paducah, Ky.

IN studying telephone operating it is just as necessary to have the operator sit erect and speak distinctly into the transmitter as it is to have the instruments to work with. Careful attention to enunciation of words and figures is a wonderful help to telephone service. Some seem to think, "just so we do the work" is all that is

Margaret Russell, Chief Operator, Jackson, Mich.

Katherine Wurdock, Chief Operator, Bay City, Mich.

Etta Bourdon, Chief Operator, Muskegon, Mich.

necessary, but there must be regularity and some system to all things, if we seek good results, and ours is a work to which much careful attention should be given.

A great many times we are rushed and overworked. But let us always bear in mind that we are dealing with human beings and let us remember to do unto them as we would have them do unto us.

Sometimes a subscriber becomes angry and seems unreasonable, because he had to wait for an answer longer than he thinks necessary; but this is largely due to ignorance, on the patron's part, of telephone work. Give them a chance to visit our exchange and hear them say, "Why, we didn't know it was like this. I'll never be impatient with central again." So let us be patient with every patron, always using a courteous "Number, please" when answering calls, no matter if a gruff tone of voice does greet us, and I'm sure you will be able to notice a change for the better. There is a great responsibility resting upon each of us. We buy by telephone and we sell by telephone and we oftentimes visit over the telephone and our company must give the best possible service and it is up to you and me to make it so. So let us put our heart and hand into our work and make it pleasant for ourselves and all with whom we come in contact and gain for our company instead of making against it.

The A B C in Telephone Work

By Alzadah Stewart, Toll Operator, Paducah, Ky.

OUR first few days in the telephone office are full of disappointment.

Our feelings are easily hurt.

Some unkind remark from a subscriber, caused by an error, would spoil the entire day for us, but after we become accustomed to our work fewer errors occur. Therefore, fewer unkind remarks are made. Occasionally we come in contact with a patron who is discourteous and it is a hard task to assume the courteous manner towards them we do to our kinder patrons. Even if it was not a violation of the rules to answer back, we have learned from months of experience that by kind treatment we can soon win their friendship. If we are sure that we have done our very best to give them perfect service, our conscience is clear and those harsh words are soon forgotten.

There are days when we think things naturally go wrong, but did you ever realize that the trouble is with you?

Try saying a pleasant "Good morning" to everyone you meet on the way to your duties. Enter the office the same way. Smile when telephoning—the smile will illuminate your life and that of your patrons. We don't only have to learn to do two things at one time, but many things at one time. The more you put in this work, the more you get out of it. For you reap what you sow. The telephone can do wonders; if it cannot render the highest type of service, we can render such service as is demanded by the American public with the guiding hand and mind of the trained operator. If the task is once begun, never leave it till it is done. "Be the labor great or small, do it well or not at all."

Qualifications for Business Employes

By Bess Oliver, Toll Operator, Paducah, Ky.

THE Bureau of Employment of the Washington Irving High School, of New York, has kept a record for many years of the qualities employers deem to be the most important in their employes. The qualities occurring most frequently in these reports of employers are cheerfulness, obedience, integrity, courtesy, persistence and executive ability.

It is a surprise to many to find "cheerfulness" at the top of the list; but to those who come in frequent contact with the average run of business employes, it is not surprising. It is said that even the cold-blooded business man places it above such other desirable qualities as "reliability," "truthfulness," and even "executive ability." No one likes the society of, or likes to deal with, a grouchy person if they can possibly avoid it. It has been said that "cheerfulness greases the wheels of industry and keeps things running along smoothly, rythmically and without noise."

The second qualification mentioned is "obedience." "Obedience is professional politeness." The respect due to the employer from the employe is shown by the obedient spirit in which the employe performs his duties.

Public Utility Commission News

Reports Concerning the Activities of State Regulating Bodies in the Telephone Field

New York

THE New York Public Service Commission of the Second District, in presenting its report to the leigslature for the year ending December 31, 1914, states that 298 entire days of the calendar year were devoted to hearings, 630 in number, in Albany, Buffalo, New York and throughout the state. Notwithstanding that during every day of the ordinary business year the commission or one of its members was thus holding public sessions, 2,195 formal and informal cases were settled between March 16, 1914, the date the present personnel of the commission was organized, and the first of the year.

During the latter period 1,756 new cases were filed with the commission—slightly more than the usual number for a like period in other years. That the commission disposed of 2,195 cases shows that the pressure applied has resulted in the performance of just twenty-five per cent more work than might be considered normal. The result is that the accumulation of cases that piled up previous to March 16, 1914, when the membership of the commission was reduced by unfilled vacancies, has been wiped out, and the commission's calendars are now free of all but strictly current business. On March 16 there were 390 formal and 558 informal cases pending. On January 1 there were but 182 formal cases and 327 informal cases, all in active process of settlement.

Notwithstanding many additional functions imposed on the commission by the legislature since 1908, such as the regulation of telephones and telegraphs, and the growth of the business under the commission's regulation in the other fields, the expenses have increased but 44 per cent, which, with one exception, is a smaller increase than that of any other department.

These figures do not include the $100,000 appropriated last year for the inventory and appraisal of the New York Telephone Company's property in New York City, of which $92,000 remains unexpended.

Important changes are recommended to the legislature. These include the extension of the authority to suspend proposed rates, pending determination of their reasonableness, to the rates of telephone and telegraph.

It is recommended that the sale or transfer of telephone or telegraph properties and the acquisition of stock or bonds in one telephone or telegraph company by another be made subject to the approval of the commission as are like transactions of other public service corporations, and that all telephone companies in the public service be subjected to regulation under the statute, instead of exempting those whose property is less than $10,000 in value.

Through a hearing before Commissioner Hodson the proposed toll rate of five cents on telephone calls between Dunkirk and Fredonia have been abandoned by the telephone companies engaged in this service and subscribers in these municipalities may continue to communicate as if within the same zone as heretofore. The case was taken up on the complaints of the Dunkirk Merchants Exchange, the South Shore Grocers and Shippers' Association, Westwood & Monroe, and Herman G. Westwood, of Fredonia, against the New York Telephone Company, Federal Telephone & Telegraph Co., Dunkirk Home Telephone Company and Dunkirk and Fredonia Telephone Company. A hearing was held at Dunkirk in July and it was there agreed that the toll rate would not be imposed until after another hearing to be held in September. This latter hearing was never held, and on the consent of the attorneys for the companies the case is now closed, with the old schedule, including no toll charge between Dunkirk and Fredonia, still in force.

Investigation of the New York Telephone Company's schedule of rates is being made by the State Public Service Commission.

It was shown at a recent hearing that the rates in Chicago are much lower than those in New York, although the local companies are controlled by the American Telephone and Telegraph Company.

An expert statistician of the commission showed a chart of the different companies controlled by the American Telephone and Telegraph Company. It was shown that the capital stock of that company is valued at $340,797,679, and the capital stock and bonded indebtedness of the concern is placed at $511,521,679; also that the American Telephone and Telegraph Company licenses nearly every company in the United States. It was stated that 96.44 per cent of the Western Electric Company stock is controlled by the big company.

The Ohio State Commission on July 16, 1914, granted the Akron People's Telephone Company consent and authority to issue $750,000 seven per cent cumulative preferred capital stock and to dispose of its seven per cent cumulative preferred capital stock of the total par value of $380,000, the proceeds to be devoted to and used for the payment and discharge, or refunding or reorganization of said The Akron People's Telephone Company's outstanding bonded indebtedness, represented by its six per cent mortgage bonds.

The Akron People's Telephone Company since has filed a petition to show to the commission that considering present conditions, this preferred stock cannot be advantageously disposed of at this time, and further, that it has entered into a contract to sell and dispose of an issue of seven hundred first mortgage refunding six per cent ten year sinking fund gold bonds, aggregating $400,000 par value, to be dated January 1, 1915, and payable January 1, 1925.

After hearing the evidence and it appearing that, at this time it is not possible for The Akron People's Telephone Company to advantageously issue and dispose of its preferred capital stock authorized to the terms and provisions of the order of the commission, and further, that the present outstanding bonded indebtedness of The Akron People's Telephone Company matures on the first day of January, 1916, and

further that indebtedness should, on or before said date, be refunded or reorganized, and also that the money to be used for the refunding or reorganization of such bonded indebtedness should be procured by the issue of proper capital obligations of said corporation, the petition was granted.

Ohio

The Swanton Home Telephone Company, Swanton, Ohio, on July 28, 1914, filed a petition for the consent and authority of the Ohio Public Utilities Commission to issue common capital stock at the total par value of $9,250, such common capital stock to be distributed pro rata among the stockholders of The Swanton Home Telephone Company instead of money actually expended from the company's income account, for the construction of additions, extensions, improvements and betterments to the plant and system of the Swanton company, which money such stockholders might otherwise have received in dividends as a return upon their investments in the securities of the corporation.

After considering the pleadings and examining the exhibits, and it appeared that the proceeds of the common capital stock were to be devoted to the reimbursement of the treasury of The Swanton Home Telephone Company for money actually expended within five years preceding the date of the filing of the petition for the construction of additions, extensions, improvements and betterments of the company's plant and system, and the commission is satisfied that its consent should be granted to the issue and sale.

The Athens County Home Telephone Company of Ohio, on January 4, 1915, filed a petition for the consent of The Public Utilities Commission of Ohio to issue its six per cent preferred capital stock of the total par value of $3,700, the proceeds to be used to repay money borrowed for the construction, completion, extension and improvement of the plant.

After hearing the evidence and examining the exhibits it appeared that the proceeds of said preferred capital stock were to be used for the payment and discharge of petitioner's lawful obligations incurred in the construction, completion, extension and improvement of its plant and system, and the commission granted the petition.

The Millersburg, Wooster and Orrville Telephone Company, on December 1, 1914, filed a petition for the consent of The Public Utilities Commission of Ohio to issue common capital stock of the total par value of $100,000, the proceeds to be used to pay and retire present outstanding bonded indebtedness of $50,000; to pay indebtedness incurred in the construction, completion, extension and improvement of plant property of $18,600; for the construction of additions, extensions, improvements and betterments to plant and property, the sum of $1,400.

After considering the evidence, it appearing that the proceeds of said common capital stock were to be used for the payment and retirement of a part of petitioner's present outstanding bonded indebtedness, to pay and discharge petitioner's indebtedness incurred in the construction, completion, extension and improvement of its plant and system, and for the reimbursement of petitioner's treasury for money actually expended for additions, extensions, improvements and betterments, the commission was satisfied that the petition should be granted.

The Farmers' Telephone Company of Ohio, on March 10, 1914, filed a petition for the consent of the commission to issue capital stock at the total par value of $76,000, the proceeds to be used for the payment and retirement of its present outstanding mortgage bonds of the total principal sum of $22,000; the payment and discharge of notes and accounts, made and incurred in the construction, completion, extension and improvement of its plant and facilities of the total amount of $22,988.19; and the balance of such proceeds to be used for the construction of further additions, extensions and improvements.

After hearing the evidence, and it appearing that the proceeds of the common capital stock were to be used for the payment and discharge of petitioner's outstanding bonded indebtedness, the payment and discharge of petitioner's lawful obligations incurred in the construction, completion, extension and improvement of plant and property, the commission granted the petition.

The New Concord Telephone Company, New Concord, Ohio, B. Forgan, E. S. Bloom and Frank F. Fowls, receivers for the Central Union Telephone Company, on December 19, 1914, filed a joint petition for the consent of the commission for the retention of the connecting arrangement between the telephone systems of The New Concord Telephone Company, of New Concord, Ohio, and the Central Union Telephone Company, and the interchange of service between these companies.

After considering the pleadings, and it appearing that the service furnished the public will be improved thereby, and further that the public will be furnished adequate service for a reasonable and just rate, rental, etc., and also that no increase in rates nor diminution of service will result therefrom, the commission granted the petition.

Kansas

The Kansas Public Utilities Commission will be in Parsons March 9 to hear the application of the Missouri and Kansas Telephone Company for the right to increase its rates. The commission will conduct an open hearing at which the company will be permitted to show why it believes an increase is justified and telephone subscribers and the public generally can testify why it is not, if they feel so disposed.

The application for the right to raise the rates was filed December 14 with the utilities commission. The company claims that the present rates are not remunerative and asks the privilege of raising them from $2.50 to $3 a month on individual business lines; $2 to $2.50 a month on two-party business lines; $1.50 to $1.75 on individual residence lines, and $1.25 to $1.50 a month on two-party residence lines. Permission also is asked to install four-party lines at $1.25 a month.

The company's franchise in Parsons, granted in 1906, gives it the privilege of applying to the state utilities commission for an increase in rates after it has acquired from 1,500 to 2,000 telephones. The franchise has eleven more years to run.

The Kansas Public Utilities Commission has begun the investigation into the right of the telephone companies to collect in advance for telephone service. The investigation was ordered by Governor Hodges, who said that the companies were thus enabled to carry on their business upon capital supplied by the subscribers in advance of the service.

While the governor and the commission had received numerous complaints about the advance collections, not one person appeared to offer objections at the hearing. About a hundred telephone men from large and small companies, Bell and Independent, were present. It was argued that if the companies waited until the end of the month to collect many accounts would be lost. The Bell company told the commission that before the advance collection rule was enforced 44 per cent of its Topeka accounts were delinquent, while now only 12 per cent are not paid promptly. It was suggested that rebates be allowed for advance payment or a penalty attached for delinquents as a possible solution of the trouble.

Washington

In the matter of the complaint of the Phinney Avenue Improvement Club of Seattle against the Pacific Telephone and Telegraph Company, protesting against the use of the word "Ballard" as a prefix for the telephone numbers in that section of the city, the state Public Service Commission, in order No. 1,590, denies the request for change, declaring that the word is a perfectly good prefix and casts no odium upon the residents or district involved.

It was alleged by complainants that the use of the word "Ballard" misleads the public into belief that all telephones having that prefix are located in the city of Ballard, and that the residents of the Phinney avenue district are inconvenienced and damaged by reason of this fact, preventing the sale of property. Ballard is the name of a city, now a part of the city of Seattle, which is noted for its manufacture of lumber and shingles, and Phinney avenue is a residential portion of the city of Seattle. The commission says:

It is the opinion of the commission that the selection of a prefix by a telephone company is a matter of business management with which the commission has no right to interfere, unless the word chosen should in itself be offensive. The name 'Ballard' was borne by one of the best-known and most respected families in Seattle. The city of Ballard is the residence of many of our most respected citizens. While it is true it is a manufacturing city, it has its residential portion which commands a view of Puget Sound and the Olympics unexcelled by any other portion of Seattle. We do not believe that the word 'Ballard' is offensive to anyone in the sense which would warrant this commission ordering a change.

Wisconsin

The Wisconsin State Railroad Commission has finally completed its valuation of the property of the Wisconsin Telephone Company of Milwaukee, and the figures which have been submitted to City Attorney D. W. Hoan will enable him to prepare his case in support of the city's petition for a revision of telephone rates and rules of service in Milwaukee.

The commission's valuation places the reproductive value of the telephone company's property in Milwaukee at $3,225,276, and allowing 15 per cent for extras, the total valuation is placed at $3,709,067.40.

The petition before the Railroad Commission was filed by the city attorney at the direction of the common council Sept. 1, 1911. The city could not proceed with its case until a valuation of the property was available.

The Wisconsin Telephone Company is preparing to carry to the state supreme court, and if necessary to the supreme court of the United States, its fight against Wisconsin's physical connection law.

In a recent decision Judge E. Ray Stevens of Dane county, upheld the railroad commission in ordering the connection of toll lines of the Bell and La Crosse companies.

He held that the right of the state to make the order was based on its police power rather than that of eminent domain, and that therefore the Bell people were not entitled to compensation. The company contends that such connection is taking property without due process of law.

Michigan

The Michigan Railroad Commission has just handed down a decision that will be of great interest to many telephone subscribers. The commission held that mutual telephone companies must transmit toll business. The decision was made in the case of the Reading Central Telephone Company, an incorporated concern doing business for profit, against the Fayette Rural Telephone Company, a voluntary association of individuals conducting a mutual telephone exchange at Jonesville.

The Reading Company complained because the Jonesville Company refused to exchange service and charge tolls for the same, the mutual company furnishing free exchange for its patrons. The railroad commission in its opinion said among other things:

The switchboard of the Fayette Rural Telephone Company has physical connection with the like facility of the Reading Central Telephone Company. A person, corporation or association which sets its poles and strings its wires upon highways, which installs a central switchboard and which gives means of communication between its immediate patrons and with those of distant organizations, can not be said to be a private facility because the cost of its maintainance is apportioned in the form of an assessment. Such an organization is clearly doing a telephone business. Although such an organization may be doing business upon the mutual basis, it is doing business affected with a public interest; its tendency is to monopolize its field of operation, for it would be economic waste to duplicate its facilities and even duplication of lines would give access to only a limited number of telephone users. It is quite possible that the patrons of such a system may not desire to send messages beyond the limits of their own exchange but telephone users at a distance may desire to communicate with its patrons and for that reason if it occupies the public streets it must recognize the public character of its facilities.

The telephone company that desires to pursue the mutual plan should be permitted to do so, but every telephone company is in a sense public as well as mutual and local, and it must discharge its public function which is to perform the duties of a common carrier, subject to the limitations of its facilities, and in a broader sense the function can not be performed on the so-called mutual or free service plan, but so far as long distance service is concerned it must be upon the basis of a fixed toll of general application throughout the territory served, with definite division as between the companies rendering the service.

The commission found that the Fayette Rural must interchange telephonic communication with the Reading Central Company and the toll charges should be upon the toll schedule of the Michigan Independent Traffic Association.

The Thermal Telephone

Abstract of a Paper Presented Before the Royal Society of England

BY M. DE LANGE

THE invention of the thermophone, or thermo-telephone, was made by me in co-operation with my friend Otto Fischer. Some of the models have been made in the laboratory of the University of Utrecht by the assistant, Mr. Stellema, under the supervision of Professor Zwaardemaker. I have been demonstrating with these models for over six months, and they do not show the slightest wear.

The origin of thermophones may be traced back to the invention made 34 years ago by Sir William Preece (Proceedings of the Royal Society for 1880, No. 204), who connected a thin platinum wire with a diaphragm and thereby succeeded in reproducing sound waves of the human voice on the diaphragm.

Sir William Preece, however, kept his invention connected with a mechanical operation—namely, by the extension and contraction of the wire being transmitted to the diaphragm, thus causing it to speak. Herein lies the great difference between his invention and that of the thermophone, as the thermophone does not depend upon mechanical operation, but simply and solely depends upon change of temperature in a wire without attachment to any diaphragm. In fact, the wire speaks without a diaphragm.

The basis of this invention has been laid by the Russian engineer, Mr. Gwozdz. About seven years ago Mr. Gwozdz made various experiments in a small village in the neighborhood of Lodz, in Poland, with a thermo-telephone without a membrane and without an electro-magnet. Gwozdz placed a Wollaston wire in an insulating medium, and then treated the Wollaston wire with acid. He obtained thereby a good thermophone, but (as far as I know) it was impossible by this process to obtain thermophones which conveyed the required volume of sound and Gwozdz never succeeded in making it practicable.

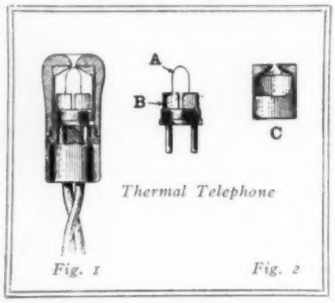


Fig. 1 Fig. 2

Curiously enough, at the same time Prof. Abraham, of Paris, made some experiments with a thin platinum wire, which he connected with electrodes in a straight line and then again with a transmitter. These experiments also did not give a practical result, because the stretched wire had no freedom, and thereby was exposed to too great a danger of breaking.

In my invention I follow the process of Gwozdz regarding the treatment of the Wollaston wire, but I claim that my invention is of the greatest practical value. By fixing a wire of a diameter of from 2 to 12 microns in a gothic curve I claim to have succeeded in making the thermophone of practical every day use, because the silver of the Wollaston wire is thereby removed by solution, whilst the whole Wollaston wire is freely suspended in the acid in such a way that at any time such part of the platinum wire can be set free as is considered desirable, without it being liable to breakage.

In order to know something more about the working of the thermophone Prof. Zwaardemaker and myself have measured the volume of the sound with Lord Rayleigh's well-known mirror. In order to avoid currents of air which might originate from the increase in heat of the wire we placed a glass membrane in a wooden or aluminum cover between the wire and the mirror. The size of the membrane was about the same size as that of a membrane of a phonograph. Moreover, we placed a small tube in the cover of the membrane in order to prevent the system from working as an air thermometer. The result of our measurement was that the sound increased with the number of platinum wires, but not in the same ratio. Thin wires of 2 microns have a greater acoustic effect than wires of 5 microns, the joulean heat remaining the same.

Everything depends upon the exact relationship between the telephone and the microphone.

The thermophone, listened to in the open air, sounds extremely weak. As soon, however, as the platinum wire is placed under a cover which has a small opening or several small openings, the sound at once becomes clear and distinct. The volume of the sound increases in accordance with the decrease of the size of the cover. Evidently the cover functions as a resonator. It is a telephonic advantage to make the cover as small as possible, because in that case the high notes and the consonants produce a better effect. The size of the opening in small covers should not be made too large, because in that case the resonance becomes too high, and produces a curious sound in addition to the human voice. I am trying to find an explanation for this most curious phenomenon.

The maximum size of the cover appears to vary between, comparatively speaking, wide limits. The size which is approximately the same as that of the human ear funnel seems to be the most suitable. Metal covers are better than those of ebonite, and by surrounding these with some cooling substance the acoustic effect —if measured with Lord Rayleigh's mirror—becomes twice as great. In this case the sound is conducted through a rubber tube of small bore.

It is quite possible to combine a number of these thermophones, but then it should not be forgotten that the whole space occupied by them should remain as small as possible, because the space which they take up together also acts as a resonator.

The acoustic effect appears to increase roughly at least as the square of the current. Thermophones made up of four rows side by side, each row having six platinum wires of 7 microns, with a resistance of 35 ohms, give deflections with Lord Rayleigh's mirror as follows:—

With 6 volts, 2½ divisions.
With 8 volts, 15 divisions.
With 10 volts, 25 divisions.

It is difficult from these results to construct the theory of the thermophone. The most I can say is that the decrease and increase of heat in the platinum wire of the telephone takes place isochronously with the vibrations in the microphone. The air surrounding the plati-

inum wire is thereby immediately heated or cooled in accordance with the increase and decrease of heat in the wire, and, if that air is retained within a closed compass of the cover, the expansions and retractions will be noticed as sound.

The construction of the receiver will be understood more readily from Figs. 1 and 2, which show the smallest size for insertion in the ear. The Wollaston wire is seen at *A*, attached to two small brass half-circular blocks, *B*, from which there project two small pins. These pins fit into a small socket, embedded in ebonite, to form the complete receiver as seen in Fig. 1. The metal cap *C*, with a very small opening at the top, is slipped over the terminal blocks, *B* and forms a resonator. An ebonite cap completes the whole. If a large receiver is desired, such as can be placed against the ear in the ordinary way, half a dozen platinum wires are arranged in parallel. The platinum wire, which may be as small as 2 microns (0.002 mm.), is, of course, actually much finer than the line in the diagram, being invisible.

Mr. de Lange gave a representative of the London *Electrician* an opportunity of trying this new telephone. From the point of view of the user, he reports, two points were very noticeable. The first was the sensitiveness of the instrument, whether in the small ear form or in the larger type. For example, two ordinary transmitters were used coupled in series. Speech was quite audible in the receiver in the next room even when the transmitters were placed downwards on the table (*i. e.*, with mouthpieces blocked) and the speaker was speaking in ordinary tones about three yards away. The other point was that, however loud the speech, the effect at the receiver was not unpleasant, as it is liable to be with the electro-magnetic receiver. The timbre, as would be expected, is good because there is no diaphragm tending to reinforce particular notes. Also there is no reason for any vexatious variations of sensitiveness. Such tests are necessarily very incomplete, as they do not cover all service conditions, but they are at least promising.

This receiver is intended to be worked simply in series with the transmitter and, therefore, the usual induction coils would be omitted. Mr. de Lange is confident that long lengths of line can be worked in this simple way. There should, therefore, be a cheapening of line material. In regard to the cost of the receiver itself it is obvious that it must be very much cheaper than the usual electromagnetic type. As to the life of such instruments, it is rather early to say much; but there is no obvious reason against a lengthy life, owing to the extreme simplicity. Mr. de Lange states that he has been demonstrating with his present models for the past six months, and that they show no signs of wear.

There will no doubt be a considerable opening for the small type of receiver among persons suffering from deafness, so long as this is due simply to want of sensitiveness of the drum of the ear or fibres, apart from the nervous system.

Mr. de Lange has come to England from Holland with his partner, Baron van Lynden, as he feels that there is a larger opening in Great Britain than in his own country. It is the intention of Mr. de Lange to open works under the management of Mr. de Vries, and to start manufacturing shortly. Legal matters are in the hands of Dr. W. R. Bisschop, who, though of Dutch nationality, is an attorney-at-law in England. Before long, therefore, we may expect to see the commercial development of this interesting invention.

Topeka Indorses Automatic Equipment

After correspondence with various cities where automatic telephones are in operation, and making investigations as to the desirability of establishing such a system in Topeka, Kans., the Industrial Council adopted the following resolutions at its last meeting:

WHEREAS, The secretary of the Industrial Council of Topeka, in pursuance of a former resolution, has communicated with a large nnmber of automatic telephone subscribers in cities where that system of telephones is in use; and,

WHEREAS, Over 90 per cent of the replies received have been highly favorable to the more modern system; and

WHEREAS, It has been shown that public ownership of telephones, here and abroad, has greatly reduced the cost of telephone service to the people, as well as to improve the service; and,

WHEREAS, The average citizen of Topeka now finds it burdensome to support the present telephone system with its overloaded party line, its autocratic management, and its high residence rates; and,

WHEREAS, Many states are now passing minimum wage laws compelling telephone companies to pay not less than $9 a week to telephone operators, while the present company is only paying an average wage of $4.87; and,

WHEREAS, If the rates are ever to be low enough to interest the laboring man, it must be largely at the expense of the company's employes, now receiving low wages; and,

WHEREAS, It is desirable that the rates be brought low enough to interest the working people, and afford a high standard of service; and,

WHEREAS, The issue of bonds for building profit paying utilities tends to lighten the burdens of the taxpayer who now carries almost the total cost of the city administration; therefore, be it

Resolved, That the Industrial Council of Topeka commend the proposition for the issuing of $900,000 worth of 4½ per cent bonds for the purpose of constructing a modern automatic telephone system in Topeka, and lends its moral support toward the assistance of this proposed municipal enterprise.

Practical Telephone Work for Technical Students

The training of the modern technical student can no longer be considered complete or even useful with merely a theoretical foundation. He must also be instructed in the practical phases of the work. Recognizing this fact, that text books must be supplemented by actual working knowledge, the University of Iowa is planning to install a complete Western Electric telephone central office equipment which is to be used exclusively for the benefit of the technical students in demonstrating the operation of a telephone central office.

The switchboard, which is of the No. 1228 central battery non-multiple type, will have an equipment of 20 common battery lines, 5 magneto lines, 4 common battery cord circuits and 3 combination cord circuits. Each of the latter will be equipped for different types of ringing, such as two-party, four-party pulsating, one-way ringing, two-way ringing and all of the other combinations usually found in a telephone central office. For use in connection with this switchboard there will be a main distributing frame and a complete protector equipment. A No. 1407 testing cabinet will also be furnished and by means of this all of the tests usually made by a wire chief can be duplicated.

There will also be a number of modern telephones connected to the switchboard. These will include a number of No. 1333 metal type wall sets, several of the No. 1020 type desk telephones and the No. 147 type folding gate telephone bracket.

The students will be instructed in switchboard operating, wiring and trouble hunting. In fact, every branch of telephone operating and maintenance work will be demonstrated during the term.

European Telephone Development

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SCHOLZ

THE operation of the telephone system used in the Liegnitz and Leipzig exchanges is the following for the first selector and is shown in Fig. 1. If a subscriber removes his receiver, the talking circuit connection is made in place of the calling circuit connection. The common battery circuit is closed by way of a coil of the calling relay, the a-branch, the telephone instrument, the b-branch and the second coil of the calling relay. The calling relay $R1$ calls and closes the current circuit of the rotating electromagnet $D1$ (earth, interrupter U_1, interrupter-supervisory relay UK_1, g_1), D_1, t_1, r_1, capacity. The first selector rotates owing to the interrupter circuits, until the c-arm finds an open wire to a second selector. If this is the case, the cut-off relay of the I-selector is excited, and the selector remains at this open wire, because the current circuit of the electromagnet $D1$ is interrupted. By the action of T_1, the telephone line has been connected by way of the selector arms of the I-selector, with the I-selector, at the same time disconnecting the calling relay R_1. At the same time the 600 ohm coil of T_1 is short circuited.

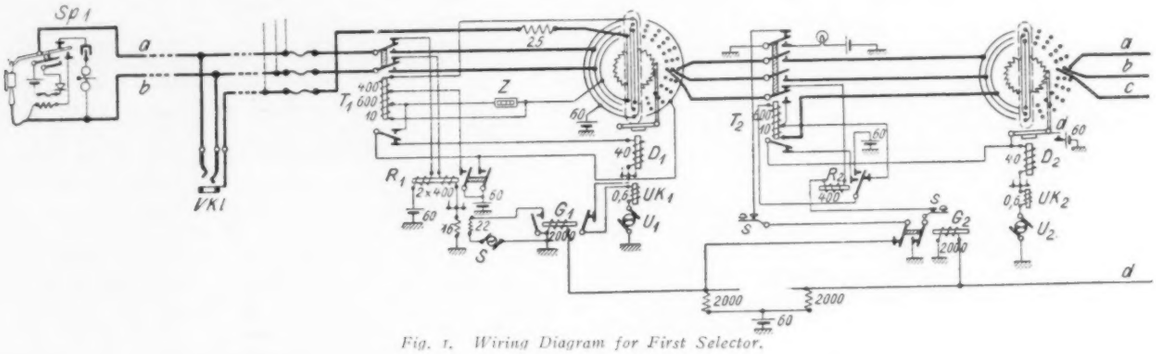


Fig. 1. Wiring Diagram for First Selector.

Other I-selectors cannot operate the same c-branch, as the current which would flow through a T-relay set on the same contact would not be sufficient to cause them to speak. T_1 cannot be excited, if its windings (10+600) are wired in parallel with only 10 ohms. Locking fingers in the second selector row allow the selectors in question to be locked in case of trouble. As soon as the I-selector has come to rest with its c-arm on a line to the free II-selector, the latter's calling relay R_2 speaks, and closes the circuit of the electromagnet D_2. In addition the testing current circuit to the translator of a I-group selector is prepared for operation. If the c-branch-arm of the II-selector reaches a c-branch, which leads to an open translator, T_2 is excited. The II-selector comes to rest, as the circuit of the electromagnet is interrupted. The calling relay R_2 is cut off, so that the c-wire coming from the I-selector is connected by way of the 10 ohm coil of the cut-off relay T_2 with the c-wire and the translator. At the same time the latter is closed for other calls, as the cut-off relays of the II-selector are not excited, if they strike the line in question. A resistance of 20 ohms is then placed parallel to the coil of the T-relay. The contact d is an auxiliary contact of the electromagnet armature D_2 and has the purpose to lengthen the current impulses for D_2 in order to obtain assured working of the electromagnet.

In Fig. 2, the relay set for the current impulse sender, which contains the feed-bridge for the calling telephone, and will here be called simply "translator," includes besides three condensors, eight relays and a ring-translator (4×25 ohms) as is seen in the figure. Three relays, C, V_1 and V_2 are built as retarding relays, i. e., they have a special copper jacket over the core, so that their armatures shall not follow short current interruptions, but shall fall away only when the circuit is broken a longer interval of time. The rest of the relays are speed-relays, whose armatures are able to follow short circuit interruptions very rapidly. The resistance of 50,000 ohms which bridges the condensor of 0.5 mf. is necessary, in order to have a weak direct current flow in the circuit from the translator to the connector after the connection has been made. Experience has shown that selector contacts give considerable trouble, if they are only excited by telephone currents, and these disadvantages can be avoided if additional weak direct currents are used. The operation of the translator is as follows: If the subscriber works his contact fingers, say from the number 7, there is at first no effect on the exchange relay. When the disc returns, however, the wire loop is interrupted rapidly in succession, this time seven times. As a result the relays A and B of the subscriber's telephone will drop their armatures seven times. Every time that A drops its armature, the a-branch behind the ring translator is short circuited. In this manner seven impulses are produced in the line, which cause the operation of the group and then the line selectors and connector. At the same time that the armature drops from A, the relay V_2 is excited. The contact of the C-relay lying within this current circuit is closed. As V_2 is a slow relay, its armature does not follow the individual current impulses of the A-relay, but remains excited for the entire time that the impulses are sent. Only after all the impulses have been sent, and there is a longer interval, does V_2 drop its armature. Another relay B causes

the switching of the various selectors from the lifting to the rotary motion. This shows that in the automatic system, the current impulse senders have, aside from the task to furnish the calling telephone with current, also the task to change the simple current interruptions caused by the subscribers into current impulses, which shall operate the line selector relays

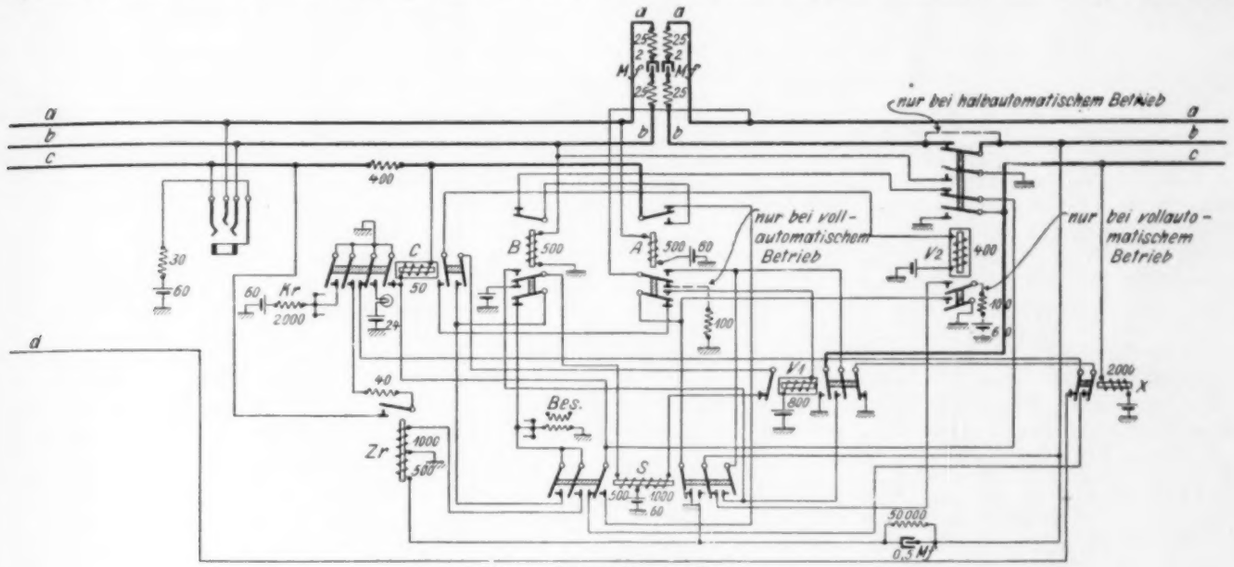


Fig. 2. Current Impulse Sender.

of the various selectors. Relay V_1 remains excited, until the calling subscriber hangs up his receiver. Its office is to operate the I-group selector. It remains excited as long as the *A*-relay in the feed bridge of the translator is within a current circuit, and keeps its armature attracted during the current impulse transmission act. Bridging of the *B*-relay during the sending of impulses by the contact v_2 has the object to have a greater current strength at disposal for the working of the *A*-relay and thus to assure certain operation of the relay. Relay *S* causes the release and relay *Zr* does the counting. Relay *X* permits the locking of the translator from the I-selector.

Whereas in the automatic system the current impulses are sent direct from the translator to the I-selector, we have in the semi-automatic system an intermediate step in the shape of the operator's telephone set. If we follow up this latter operation, we see that the calling subscriber is not connected for the length of his call to the I-selector, so that the current impulses may not balance when passing through the translator and cause a clicking noise in the receiver. As soon as the II-selector has reached an open translator, the latter's *C*-relay speaks. In addition the *A*- and *B*-relays also operate, as the telephone line is in circuit with the translator (earth, *B*, *b*-branch, telephone instrument, *a*-branch, capacity). At the same time V_1 is excited and connects the I-selector.

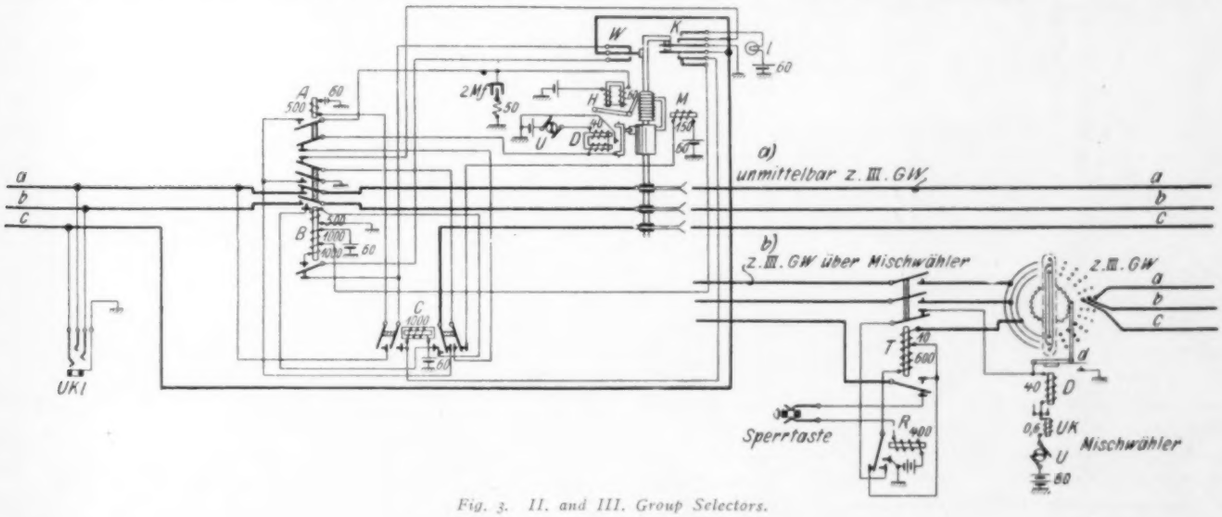


Fig. 3. II. and III. Group Selectors.

C speaks, and connects the *B*-relay of the I-seceltor. In addition the cut-off relay T_1 of the trunk line selector and through *B* the electromagnet *D* of the same trunk line is connected. The trunk line selector seeks out a free wire leading to the exchange operator and remains there until connection is made.

II- and III-group selectors in Fig. 3 both have

the same wiring diagram. As the relays *B* and *C* are excited, as soon as a I-group selector has been set for some line in the II-group selector, the *A*-relay is connected to the *a*-line, the relay *B* with its 500 ohm coil to the *b*-line. These latter *a*- and *b*-branches are both connected to the exchange or to the translator, as the case may be. If now current impulses are sent, as described before, the lifting electromagnet is excited,

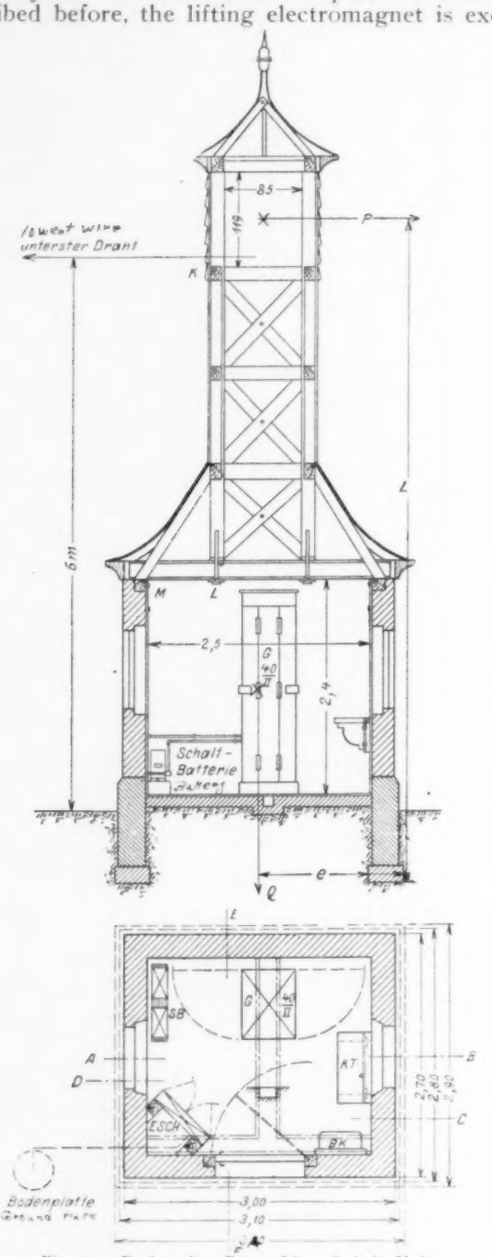


Fig. 4. Design for Party Line Switch Units.

depending on the number of impulses sent, the current going over (earth, *b*, *a*, *H*, capacity). If then *A*- and *B*-relays drop their armatures, the current circuit of the rotating electromagnet *D* of the selector is closed (earth, *K*, *b*, *c*, *a*, *D*, *U*, capacity). The second group selector rotates, until the relay *B*, acting with its 500 ohm coil as testing relay, is excited by way of the *c*-wire of a free III-group selector in a 100,000 system, and of a line connector in a 10,000 system. If this is done, the current circuit of the rotating electromagnet is interrupted, and the relay *C* becomes currentless. The *B*-relay is held, after falling off of *C* over *w*, *b*, and its two 1,000 ohm coils. The locking of the III-

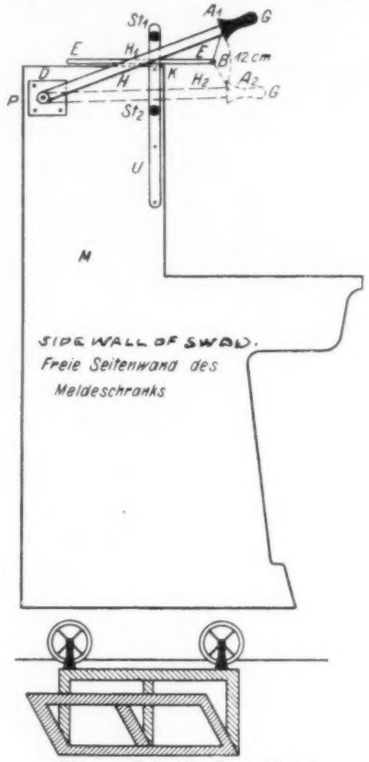


Fig. 5. Call Slip Transmitter.

group selector o rthe connector is obtained through the grounding of the *c*-branch over *c* and *b*. The figure shows how at *b*, the contacts in the contact set of the II-group selectors are not connected directly with the telephone sets of the subscribers, but that they end similarly as is the case in the I- and II-selectors in 10- or 25-section simple selectors, to whose contact sets the subscribers' wires are connected in multiple. In this way from each II-group selector from 100 to

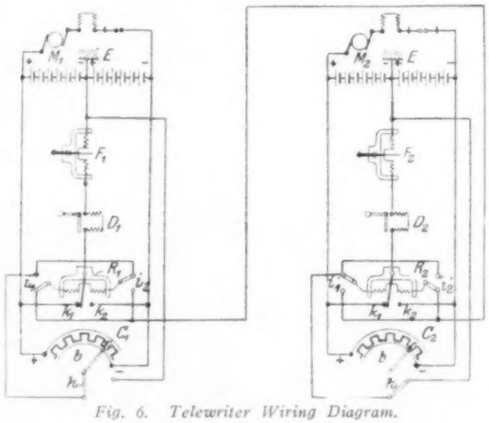


Fig. 6. Telewriter Wiring Diagram.

250 subscribers' wires can be reached. If a II-group selector strikes a free contact, the *R*-relay of the mixed selector is excited. *R* closes the current circuit for the rotating electromagnet *D* of this selector and prepares

the circuit for the testing relay *T*. If the *c*-arm of the selector rests on the contact of an open line, leading to a III-group selector, then *T* is excited, and *R* as also *D* are disconnected. In the other case the selector rotates until it finds an open wire. The action of this so-called "mixed selector" is therefore the same as that of the II-selector.—*Telegr. u. Fernsprechtechnik (to be continued).*

PARTY LINE SWITCHBOARD RURAL HOUSES.

The party line system has been extended within the last few years in Bavaria so much that at the beginning of 1914 there were more than 100 party line swtichboard systems with more than 2,000 connected telephones. Of these, about one-third are near enough to bigger towns to be connected to the main exchanges, and the other two-thirds are independent smaller switchboard and switch operated lines in the outlying rural districts. On the average these switch units are in sizes of 20 or 40 connections, having an average of 15.3 subscribers' lines each with 16.1 telephones connected and a main party trunk length of about 6 miles. Where no more than 200 calls are made per day this system works very well. The party lines which are connected to form a uniform closed unit through the medium of the switch unit work much better than those party lines that are connected to a more or less distant city exchange. In order to save on wire and cable costs, the tendency has been to lay this main cable from which the smaller party lines branch out as near to the center of the district served as possible. Where the districts are sparsely populated, this switchboard unit cannot always be placed near a habitation, and it has been found necessary to build a special building for these units. The thought occurred to use the simple corrugated sheet iron houses that are used for telegraph and cable terminals and to connect the overhead lines to the usual poles. There is often objection to this, however, on the ground of looks, and the following figure and explanation gives an example of switch houses that have been introduced by the Bavarian telephone department all over rural districts of Bavaria where party lines are used.

The houses were designed from the standpoint of economy with a simple dignified exterior. As it seemed necessary to provide for the largest number of wires to be connected and sent out at one side, the building was designed with that point in view. The house has space for a switchboard, two batteries, several relay sets, and an extra switch unit. The inside dimensions are 7.2 ft. width, 8.2 ft. length, and 7.9 ft. height, and for the tower a total height of 24.1 ft., leaving the height of the lowest wire from the ground 22 ft. The house is built in concrete, wood and brick, and costs from $200 to $250. The advantage lies chiefly in the good and solid construction which does not expose the electric equipment within to atmospheric changes and keeps it therefore in better shape. —*Telegr. u. Fernsprechtechnik.*

DEVICE FOR IMPROVING EXCHANGE SERVICE.

The following device was placed in a telephone exchange where eight long distance switchboards and one supervisor's board were used to furnish the service. These boards stood in a row with the supervisor's switchboard at one end. In the system used in this exchange, long distance calls, which also include calls from other city and suburban exchanges, were noted on slips for the purpose, sent to the supervisor and from there transmitted to the right operator or tended to in some other way, whatever the question might be. The supervisor's board being at one end, it was often necessary to pass a slip along the whole row of eight operators, which caused much confusion and trouble and retarded service. Finally the telephone manager worked out a device which is shown in Fig. 5 and works as follows:

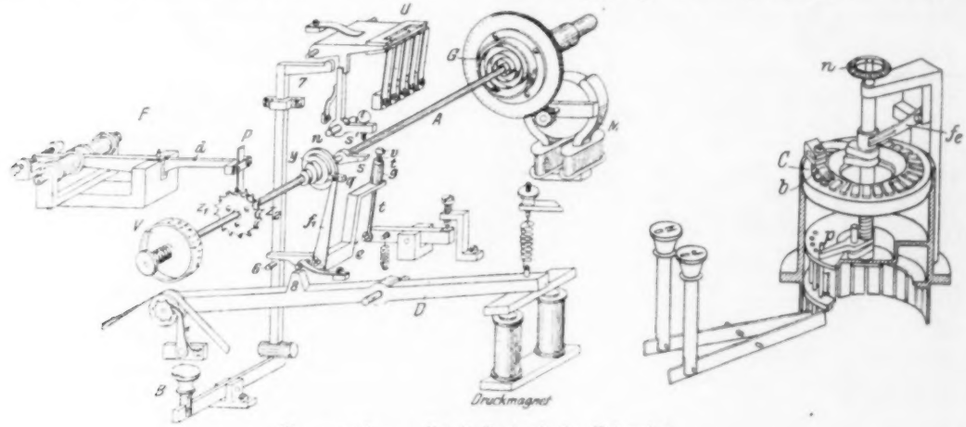


Fig. 7 and 7a. Detail Part of the Telewriter.

The device operates on the principle of the inclined plane and the lever. The single arm lever *H* is attached to the open side of the supervisor's board, and the handle *G* works the device, when pressed down. The inclined plane is formed by the steel piano wire *A-B*, which is at the level of the switchboard, and about 5 inches from the edge of the board (*K*). This wire is run from point *A* of the lever to the last or sixth switchboard and is here connected to the point *B* at the iron rail *E*. As the tension of the wire can be regulated, the lever, made of strong angle iron, can be pressed against an iron rail *U* which serves as guide to the lever. The lever can remain at rest in either of the two positions *St*1 or *St*2, one being the upper, the other the lower position of the lever. Within the possibility of motion given by the points *H*1 and *H*2, the lever can move by an angle of 25 degrees, so that the steel wire fastened to the lever can be set from the upper position *A-B* to the lower position *A*2-*B*. In doing this, the inclined plane of the wire changes

from the position in which it inclines towards the sixth switchboard into a position in the opposite direction. It is possible, by either raising or lowering the lever, to send a small frame, seen in the picture, made of brass and running on light wheels, from one switchboard to the other. If the supervisor wishes to send a message to the sixth board, she need only raise the lever, and the wire will incline towards the sixth switchboard and will send the basket with contents to that board. If the supervisor wishes to have the basket return, she changes the wire plane by lowering the lever, and the basket returns automatically. This device has been improved further by placing a small wire above the lower one, and by locking the free path of the first wire at any point, if communications are to be sent to any other operator. It is also possible to install an electric connection between the supervisor's desk and the various operators, so that a current is sent through the wire to a bell near the operator desired who will then stop the basket and take out her slip, when she receives the notice.

THE SIEMENS-HALSKE TELEWRITER.

Prior to the war several state telephone and telegraph deportments were considering the problem of

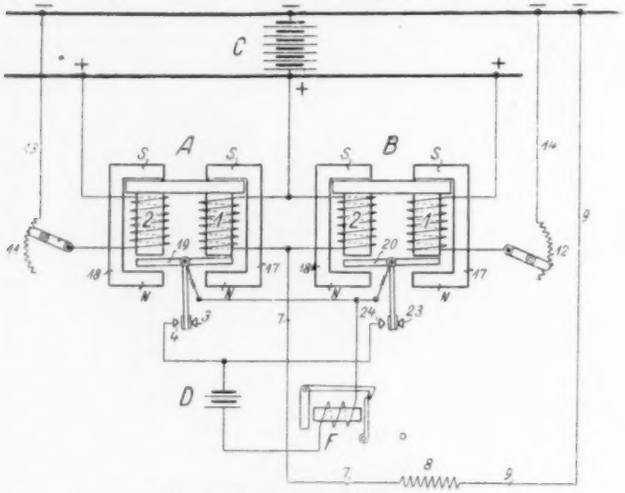


Fig. 8. Speed Relay Wire Diagram.

combining long distance telephony with verification by long distance writing, which would avoid mistakes through poor connections or incoherent conversation and would act as a safeguard in many instances. In the following paragraphs the Siemens-Halske telewriter will be briefly described and illustrated. It has a capacity of 800 to 1,300 words a minute. Fig. 6 shows the wiring diagram for the telewriter. The telewriter is operated by the motors *M*1 and *M*2. The commutator *C*1 and *C*2 consists of two gear wheels, the outer being connected to the positive, the inner with the negative pole of a battery which is grounded. The brush *b* slips over the segments of the commutator. In this apparatus current passes from the commutator over the brushes *b* in alternate directions, then over the lever *h* to the line relay *R*1, and then to the line. In the receiving apparatus these current impulses reach from the line relay *R*2 and the lever *h* to earth. The line relays of both instruments, whose contacts *k*1 and *k*2 are connected to the two battery poles and their levers transfer these current impulses to the local line circuits, which are connected to the printing magnets *D*1 and *D*2 and the transmission relays *F*1 and *F*2. The printing magnets control the typewriting or printing, the transmission relays balance the operation of transmitter and receiver. Words are sent by the instrument in this manner, that through pressing down a key at the sending station the sending brush is held automatically, and thereby the transmission of the alternating current impulses is interrupted. There is, however, a continuous current which is sent out from the segment of the commutator on which the brushes rest. The line relays transfer this continuous current to the local lines. When this is done, the typewriting device in the receiving station is set at rest and the printing magnet starts to work and prepares the equipment for taking down the message.

Figs. 7 and 7a show the details of the apparatus. The horizontal axis *A* carries at its rear end the driving spring *G*, which is kept at tension by the motor *M*. In the center is the bevel wheel *n*, with the two gear wheels *z*1 and *z*2, and at the front end is the type wheel *V*. *F* is the transmission relay, whose armature *d* is changed now to the right, now to the left by the changing current impulses. The armature carries at its free end a steel disc *P*, which lies snug against the gears *z*1 and *z*2, which are set at ½ tooth difference in mutual position. The disc *P* permits at every operation of the armature a forward motion of the axis by ½ tooth length. The rotating motion of the axis is transmitted to the commutator by the bevel gearing *n*, which passes on by one segment distance every time that the gears *z*1 and *z*2 make a movement. At the same time the type wheel moves on by one type width. In this way in both stations, the instruments are kept at a simultaneous speed and run, therefore, synchronously.

Next to the bevel gear *n* is a worm *y*. On this slips the metal piece *q* fastened to the spring *f*1; the metal piece gliding alongside the worm *y*, when the axis makes a rotary motion. The spring *f*1 rests on the rotating arm *e*, in whose collar *g* the pin *t* can move freely with its head *v*. As soon as the metal piece *q* has glided down the worm, the clutch *S* fastened to the axis seizes the head *v*, so that the motion of the axis is stopped. The head *v* in this action comes in contact with the screw *s* and brings the line switch *U* into the rest and receiving position. In this manner both the instruments at the receiving and transmitting stations are set at rest as soon as there is no pressing of the keys at either end.

The releasing of both stations when transmitting messages is obtained by pressing down key *B*. When *B* is pressed down, the pin *6* presses against the lever *e*, thus releasing the contact between *S* and *v*, and starting the transmission equipment. The axis is therefore free to move. At the same time the arm *7* brings the switch *U* into the sending position. Now the commutator of the sending station sends alternately negative and positive current impulses into the wires, which, however, cannot release the receiver. However, when pressing down the key *B*, the sending brush is held automatically, the position being on a definite negative segment. Now a negative continuous current is sent out, which operates the printing magnet in the receiving station and presses the printing lever *D* against the type wheel. At this motion of the lever, the collar *8* strikes against the arm *e* and the axis is released.

Fig. 7a shows the sending part of the instrument. The teeth of the gears of the commutator *C* engage always, so that a positive tooth is next to a negative one. The brush *b* glides over these teeth, the current being taken from the brush by means of the spring *f*. The brush is fastened in a holder, which rests loosely on the commutator axis and carries the arm *p* at the lower end. This arm moves over a box having 28 slits to correspond to the 28 pins. When pressing down a pin or a key, the corresponding pin or key or type is lifted out of its case. The rotating arm *p* and brush coupled with it are stopped at a certain position and the brush sends, while at this point, continuous current through the line, which releases the equipment at the receiving station. After releasing the pressure from the key, the type returns to the case and the brush can turn onward.

A telewriter station consists of the receiving and transmission instruments, the current source and the switchboard and safety fuses, etc. As constant voltage is required for the operation, storage batteries of usually two groups with six cells each and a total voltage of 12 volts per group, are used. As the telewriters are to be used for intercommunication between various subscribers, switchboards are used at the exchange from which connections are made as is done with the ordinary telephone service.—*Elek. u. Masch.*

USE OF A POLARIZED RELAY FOR HIGH SPEED WORK.

In low tension current work, as for example in telephone and telegraph work or signal work, it may be sometimes very essential to have an immediate notice given of very rapid and minute resistance changes and current changes. While this is possible in fairly low speeds, it was impossible to find means of showing resistance changes at speeds ranging from 1/3000 to 1/4000 seconds. Especially when the current changes caused differences in current of only milliamperes, it was impossible to find ways and means to record such minute changes.

The author, a Berlin engineer, worked with this in mind, and seems to have found an arrangement which allows recording of impulses at speeds of 1/4000 seconds, and which has a sensitiveness whose limit has as yet not been found. The diagram is shown in Fig. 8.

Around the iron armature *1* of the relay *A* or *B* a closed circuit current was sent in such a direction that the electromagnetic field produced by it displaced the magnetic field produced by the permanent magnet *17* in the core *1*. At the same time the current tends to help the other iron core *2* polarized by the permanent magnet *18* to attract the armature *19* or *20*. A second closed current circut is passed around the iron core *2* in such a direction that the electromagnetic field produced by it weakens the magnetic field produced by magnet *18* in core *2* and also the electromagnetic field produced by the first closed circuit, in such a way that in the closed circuit position the relay *A* or *B* and the armature *19* or *20* is just held by the core *1*.

If now the first current is strengthened or the second one weakened, by no matter how small a change in current or in no matter how small a time, and therefore the polarization of the core *1* by the permanent magnet *17* is weakened, then there follows immediate change of the armature by the core *2*, which has been polarized by the permanent magnet.

If, for example, we were to decrease the resistance *8* so much that there would occur a passing current increase of 12 milliamperes for 1/4000 seconds, at the moment of current increase the armature *19* of the relay *A*, in spite of the speed of the permanent magnet polarization weakening in core *1*, would be released from core *1*. The weakening effect is due to the temporary strengthened electromagnetic field. Now the armature *19* would be attracted by the core *2*, which is more strongly polarized by the momentarily increased electromagnetic field of the coil of core *1*, and the contact *4* would be closed.

If, on the other hand, the current were weakened by the same amount and for the same length of time, the analogous action would take place. Due to the decrease of current strength in the winding of core *2*, the magnetism of the permanent magnet *18* and the electromagnetic effect supporting it would increase. On the other side the core *1* would immediately release the armature *20*, as due to the decrease of the electromagnetic counterforce of the winding of core *2* the polarization from magnet *17* is weakened, and core *2* would attract the armature and close the contact *24*.

Of course, the explanation of the electric and electromagnetic forces involved is somewhat difficult, as the amounts required to make the relay act are minutely small. If the current change is 12 milliamperes during an interval of 1/4000 sec. the estimate gives an ampere-second number of 0.12/4000, which is equal to 0.000003 as. In closing it may be said that the relay armature can be returned to the original position by merely breaking the circuit momentarily in the one or the other opposite winding.—*Telegr. u. Fernsprech Tech.*

THE ELECTRIC INDUSTRY AND THE WAR.

It is interesting to note how the European countries bear up under the pressure of the war, and especially how industry, in this case the electrical industry, is affected by the war. Under the above head this department will bring short items of interest each month, which will give our readers an idea of the effect the war has had not only on telephone and telegraph work, but on the electrical industry in general.

This present issue takes up the important problem of the maintenance of the "innocent bystander," namely, the wives and children of the men who are fighting at the front. The editors of some of the foreign electrical papers received have made inquiries to find out how the various manufacturers are solving this problem, and we give the results of some of the inquiries. The Mix and Genet telephone plant pays to the wives of men now in the army 50 per cent of the wages received by the husband, which were lowered after September to 40 per cent. For every child under 14 years 5 per cent was allowed, and above 14 years, 10 per cent of the father's wages. In addition to this the company took out life insurance for all the men now in the field, allowing three shares for the office help and two shares for the workmen. In addition the wives receive $1.25 per week and the children an allowance of 25 cents per head.

Most of the reports that have come in are in a similar strain. The factories and corporations have felt it their duty to help those who are the innocent sufferers by assuring them at least that they will not have to starve.

Of Interest to the Trade

What the Telephone and Accessory Manufacturers Are Doing to Advance the Art

Automatic Holds Annual Banquet

The employes of Automatic Electric Company, Chicago, held their annual "get-together" banquet at the Auditorium Hotel on the evening of Saturday, January 16. The event marks the twenty-third anniversary of the beginning of the manufacture of automatic telephone equipment in Chicago.

H. D. Critchfield, of Automatic Electric Company's staff acted as toastmaster, and President Joseph Harris made an address in which he outlined briefly the success that had attended the company's operations during the past year. He announced that 85,000 lines of equipment had been sold and that 14 cities had been equipped with automatic telephones. These included five in Australia, one in India, two in Canada, one in Argentine Republic, and the rest in the United States, including the cities of Buffalo, N. Y., and Jacksonville, Fla.

Mr. Harris also presented gold watches to 15 employes of the company in recognition of valuable services rendered during 1914. Those who received watches included the following:

J. W. Henning, J. F. Turner, J. T. Forrest, H. B. Perrott, Geo. Green, G. W. Mecher, A. A. Hopkins, L. F. Wilke, G. A. Anderson, J. A. Emmons, C. W. Hnman, S. L. Gross, A. E. Woolny, B. W. Johnson and R. Ramsey.

Gold handled knives were presented to:

Messrs. Berntsen, Larsen, Evers, Wagner, Kain, Jesse, Rudolph, Hughes, Fisher, Meyer, Lukowski, Shay, Thornmark.

Silver handled knives were presented to:

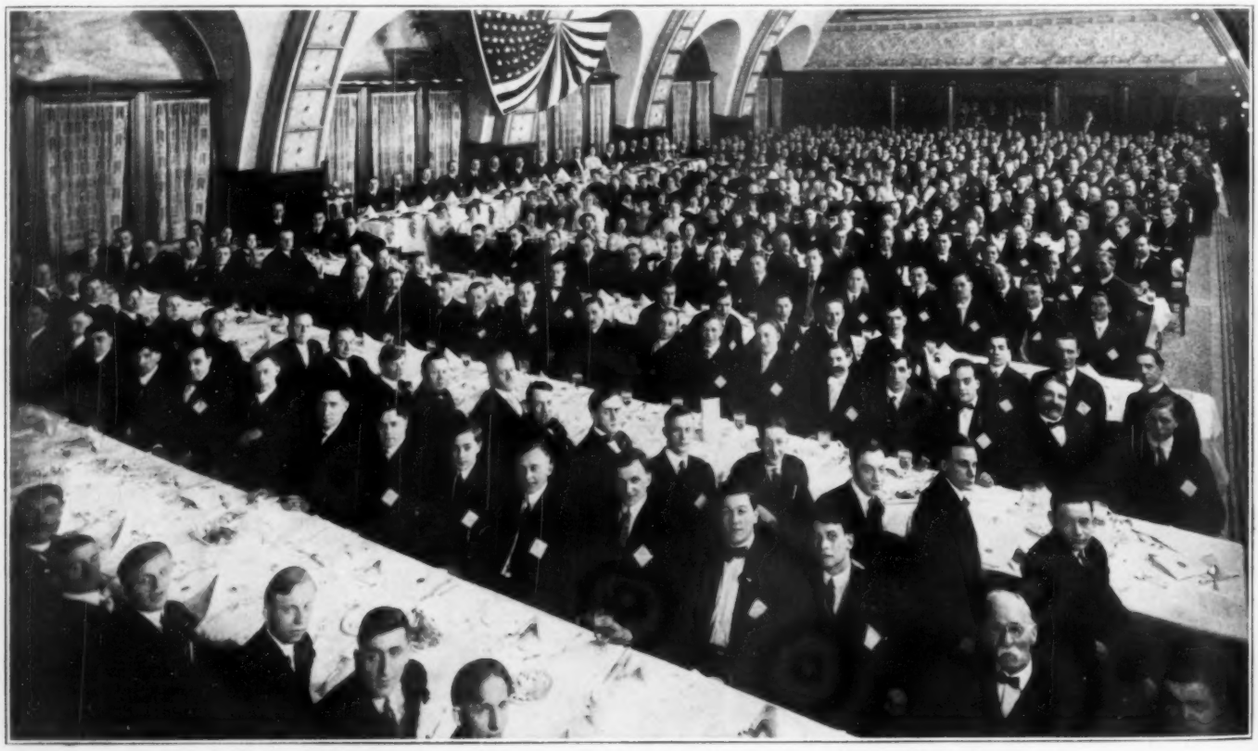
Messrs. Wright, Voxx, Ayers, Lawson, Hillaboild, Henning, Herhold, Freda, Neumann, Bergendahl, Markwardt, Borsom, O'Brien, Amborski, Stanelle, Matousek, Keller, Martin and Roberts.

The "suggestion plan" has been in operation in the company's factory for several years, and has given excellent results. During the past year a total of seventy-five employes made suggestions of one kind or another relative to the methods followed in the manufacture of automatic telephone equipment. Some of them were of considerable importance, while others involved minor details, but all tended to increase the efficiency of the organization as a whole. The "suggestion plan" is under the personal supervision of W. J. Tewksbury, factory superintendent.

New Kellogg Installation at Humboldt, Iowa

The Rural Union Telephone Company, of Humboldt, Iowa, has recently purchased a Kellogg universal multiple lamp signal switchboard.

This equipment, which consists of two sections, six panels each, in quarter-sawed oak with three operators' positions to each section, will have an ultimate capacity, of 1,200 lines, but present wiring will be for 460 subscribers' lines, multipled every four panels, 24 toll and



Annual Banquet of the Automatic Electric Company Held at the Auditorium Hotel, January 16.

30 rural lines, affording equipment for four operators' positions.

A relay rack is provided giving space for 600 lines and cut-off relays, although but 460 will be supplied at this time. The rack will be of "T" and bar iron, and will be so constructed that future additions can be made easily.

The power equipment to accompany this switchboard is designed to operate from 110 volts and will consist of two sets of storage battery; and a ten ampere mercury arc rectifier for operating from 110 volt, 60 cycle single phase alternating current.

Two sets of five frequency pole changers for universal common battery and magneto service and one set of five wall mounted transformers will also be provided.

Cook Installation at Fort Wayne

The Corwin Semi-Automatic Telephone System was installed at the "South" office, Fort Wayne, Indiana, and began operation in July, 1914. The traffic in the "South" exchange is handled by three regular operators in the Corwin system whereas twelve operators were previously required in the Manual system to take care of the same amount of traffic. The Corwin system provides automatic ringing, automatic disconnect, automatic busy test, automatic and instantaneous recall, and automatic peg-count. Either the called or calling subscriber can discontinue conversation at any time and immediately secure connection with an operator.

Traffic figures shown in the advertising section indicate the gradual increase in traffic handled by the Corwin system beginning with the month of August and showing average figures for the succeeding months to and including December of last year. During the month of November a substantial increase in traffic was recorded on certain days and on November 24 the day before Thanksgiving, the traffic showed a total of 24,960 calls with a busy hour of 2719 calls, which included 78 reverted calls, that is, calls that were transferred from the regular operator position to the information desk. The remaining 2641 calls for this busy hour were handled by the three regular Corwin operators and these calls were apportioned 828 calls to position 1, 884 to position 2, and 929 calls to position 3. The average operator hour for the period between 8:00 a. m. and 8:00 p. m. was 595 calls, this being an average of one call each 6.1 seconds. This time figure denotes the time consumed by an operator in receiving a call and completing or extending the connection.

During the month of December a still greater increase was shown. The two high days being December 24 and December 31. On December 24 the traffic was as follows: Total traffic 30,098 calls, while the busy hour was 2762 calls including 107 reverted calls. The remaining 2655 calls were apportioned to the three positions as follows: 846 calls, 878 calls and 931 calls to positions 1, 2 and 3 respectively. It should be understood that the 107 calls referred to as reverted calls were also received and disposed of by these same operators and should be included in the number of calls handled by them for the reason that it took as much time if not more to dispose of these calls than is ordinarily consumed in the usual routine. If then, we consider the total busy hour for these three positions as amounting to 2762 calls, the average peak operator hour in this particular case then becomes 921 calls. The average operator hour for this day between the periods of 8:00 a. m. and 8:00 p. m. was 706 calls, which is equal to an average of one call every 5.1 seconds. This figure, you understand, embraces thirty-six operator hours.

On December 31, the day before New Year was 28,284 calls with a busy hour of 2,633 calls, including 112 reverted calls. The remaining 2,521 calls were apportioned to the three positions as follows: 884 calls, 802 calls, 835 calls, to position, 2, 3, respectively. Considering the total busy hour 2,633 calls, as being handled by three operators, the result shows an average of 878 calls, per operator per hour. The average operator hour for the day between 8:00 a. m. and 8:00 p. m. was 687 calls. Referring to the table of averages shown at the bottom of the printed traffic record above referred to, it will be seen that the total average daily traffic for the month of November was in excess of 22,000 calls, while the average daily busy hour exceeded 2,200 calls and the operators in each position averaged considerably better than 700 calls per hour each, for the busy hour.. You will also note that the average operator hour for the month, between the hours of 8:00 a. m. to 8:00 p. m., was 544 calls, which is equal to one call every 6.7 seconds.

Carrying these average figures still further and computing them on a basis of fifteen days, the average daily traffic is 23,983 calls. During the busy hour the positions average 750,778 and 769 calls respectively for positions 1, 2 and 3, while the average position hour between 8:00 a. m. and 8:00 p. m. shows 585 calls.

On a basis of five days these figures are as follows: The average total daily traffic is 25,850 calls. During the busy hour the positions averaged 794, 793 and 804 calls respectively for positions 1, 2 and 3, while the average position hour between 8:00 a. m. and 8:00 p. m. shows 642 calls.

These figures have brought forth the suggestion, and in some cases a statement, to the effect that operators could not maintain the speed claimed for the Corwin system without injuring their health, but a close study of the operating conditions at Fort Wayne show that the operators not only can work at the speed indicated, but can continue this speed within reasonable limits and suffer less fatigue than ordinary manual operation and in fact acknowledge that the Corwin operation is less tiring and less trying as a whole, than manual.

The accuracy of the above figures is vouched for by the Frank B. Cook Company of Chicago, manufacturers of the Corwin semi-automatic telephone system, and investigation of whatever nature is cordially invited. The accuracy and efficiency of the apparatus used in connection with this system is a source of surprise to many engineers and operating men and it can be truly said that the Corwin system and apparatus has accomplished all that has been claimed for it.

Meloney Brothers Pole Stock

Melony Brothers, in a recent letter, state that they have quite a yard stock of seasoned poles and are able to make immediate shipment of practically any size.

The yards of this company are located at Spooner, Minn., and the company also maintains an office in Minneapolis.

A postal card will bring quotations on any size desired by our readers.

Thompson Levering to Exhibit at Chicago

The Thompson Levering Company will exhibit at room 1734, La Salle Hotel, during the convention, February 3, 4 and 5, an exceptionally fine line of electrical testing instruments under the brand name, "Peerless."

The Thompson Levering galvanometer of the d'Arsonval type, is one of the most compact galvanometers ever made and has a splendid reliability.

W. J. Thompson will be in charge of the exhibit and we believe that it will be well worth the while of the technical men of this independent telephone association to stop in and take a look at what this company has to show them, as we understand the instruments have been adopted by practically all of the big engineering bodies

Thompson-Levering Galvanometer.

in the country, both on account of their reliability and because of the fact that the prices correspond with an economical, but high grade instrument.

One of the latest instruments which this company has put out is a portable fault finding instrument which is practically an adaptation of a slide wire bridge. In this set the slide wire is in circular form and various steps are arranged so as to obtain the equivalent of a very long slide wire.

The instrument illustrated herewith is marked very low in price and is very efficient. This instrument can be seen at the La Salle Hotel or full information will be furnished by the company in case the reader writes direct to them at 323 Arch street, Philadelphia.

Kansas City Buys Kellogg Switchboard

The Broad exchange of the Kansas City Home Telephone Company, of Kansas City, Missouri, is to have a new switchboard, manufactured by the Kellogg Switchboard & Supply Company, equipped with the new features including automatic ringing and automatic listening.

There will be a two section common battery multiple switchboard of three positions each. The present equipment includes five hundred subscribers' common battery lines, line lamp signals throughout. The ultimate capacity to be seventy-two hundred common battery lines.

This exchange is located in one of the new subdivisions of Kansas City, a residential section, which is developing very fast and this equipment is planned so as to give the fastest and most reliable service, not only locally, but in trunk line traffic with main or other branch exchanges, under the particular conditions of the city.

The Kellogg Company will also furnish, besides the complete switchboard and accessories, a main distributing frame, complete power equipment, box and end panel and relay rack.

Frank B. Cook Secures Patents

Despite the reports and rumors which have been circulated regarding patent entanglements over the new systems or devices manufactured by the Frank B. Cook Company, Chicago, Frank B. Cook states that the Cook Company has obtained over sixty foreign patents, and in but three of these cases has there been any contest; two in one country and one in another. The same patents, however, have been allowed in several other countries as well as in the United States, which is some indication that they may be allowed in the two remaining countries.

In all their United States cases only one interference developed. This case involved a Johnson application owned by the Frank B. Cook Company and an Anderson application owned by the Automatic Electric Company. The patent office recently rendered a final, non-appealable decision in favor of the Cook Company, and no further appeal can be taken from this decision.

The Cook Company claims that, taking into consideration the large number of patent cases, and the length of time involved, this showing is remarkable and confirms the prediction made more than a year ago in published statements over the signature of Frank B. Cook.

Western Electric Materials for Coast to Coast Line

The Western Electric Company which supplied all of the line, construction material and telephone apparatus used in conjunction with the transcontinental highway line from New York to San Francisco has issued an attractive folder showing a map of the line views taken during its construction and reproductions of drawings and photographs depicting the opening of the first long distance line between Salem and Boston, Mass., in 1877, the line between New York and Chicago in 1892 and that between New York and Denver in 1911.

The photographs used in the article describing the Transcontinental Telephone Line appearing in this issue were furnished by the Western Electric Company.

Keystone Publishes Statement

Keystone Telephone System, operating at Philadelphia, New Jersey, has issued a very interesting booklet entitled, "This is about the Keystone Telephone."

This booklet gives a current report of the system's entire possessions and operations, gross and net earnings, surplus, preferred and common stock and bond issues.

Officers of the company are listed, feet in underground duct, cable and aerial cable.

The company's exchanges operator's school, restaurnts and business organization departments are all discussed in detail giving a very comprehensive idea of what this company maintains in its operation.

Automatic Elects Officers

The regular annual meeting of the stockholders of Automatic Electric Company occurred on January 12, at the company's offices in Chicago. The officers and directors were re-elected, and are as follows: President, Joseph Harris; first vice-president, J. B. Russell; second vice-president, H. A. Harris; third vice-president, Grant Pelton; secretary, W. I. Patton; and treasurer, J. P. Hauck. The board of directors is made up of Messrs. Joseph Harris, A. G. Wheeler, J. B. Russell, A. E. Keith, Grant Pelton and H. A. Harris.

Manufacturers Exhibit at the Convention

Interesting Display Arranged by Manufacturers and Dealers

THE Minneapolis convention exhibits proved to be of considerable interest to those attending. New devices and many valuable improvements to various telephone apparatus were demonstrated and presented for careful study. Those companies which had their products on exhibition were as follows:

ADSIT GENERAL ELECTRIC COMPANY, Minneapolis, offered in its exhibit a selective lockout device demonstrated under actual operating conditions. A rural telephone line was set up with six telephone sets and the device in operation proved of unusual interest.

AMERICAN ELECTRIC COMPANY, Chicago, offered an exhibit of three new pieces of apparatus consisting of a new transmitter, allowing exceptional clear articulation and tone; a receiver having magnets electrically welded, thus insuring a perfect magnetic field and combination binding posts allowing the use of any style cord terminals; a self-contained ringer with large gongs and a cone-shaped striker adjusted by a micrometer screen demanding merely the use of a screwdriver for adjusting.

Besides the company's popular line of common battery and magneto telephones and other well known electrical specialties, a 150-line Burns switchboard furnished a most interesting display.

AUTOMATIC ELECTRIC COMPANY, Chicago, furnished the visitors, as is usually the case each year, with an exhibit most convincing of the operating value of automatic apparatus.

An intercommunicating automatic system was set up with stations in all the principal parts of the hotel. The exhibit board was located in the company's headquarters and it was exceedingly interesting to note how extensively the guests used and appreciated the accurate and rapid automatic service. The entire apparatus was of the latest type and received detailed inspection constantly by the many visitors.

In addition the company exhibited the well known automatic monitor equipment, an automatic cordless P. X. B. board a telephone train dispatching system and Raven Brand cords, cables, condensers, magnetic wire and other telephone accessories included in the company's line.

Salesmanager H. A. Harris and H. D. Critchfield were in charge of the display. Messrs. Benoist, Finley, Curtis, Baer and Bartley were on the floor.

BELL LUMBER COMPANY, Minneapolis, manufacturers of cedar poles furnished the convention guests a rest room instead of an exhibit. Each guest was presented with a souvenir memorandum book containing valuable data.

COFFEY SYSTEM AND AUDIT COMPANY, Indianapolis, Ind., was represented by John W. Coffee, who explained the uses of a complete set of blank forms for keeping telephone accounts as prescribed by the Interstate Commerce Commission. It was announced that the company had decided to install a branch office in Minneapolis to be in charge of H. E. Waterhouse.

FRANK B. COOK COMPANY, Chicago, represented by J. F. Tompkins, J. M. Moore and M. J. Corwin displayed a complete line of Cook protective equipment and specialties. A sample of the Corwin semi-automatic system switch and relay was used in demonstrating this system. The company's representatives were kept busy explaining the various features of the system. Illustrated literature descriptive of the Cook installation at Fort Wayne, Ind., was distributed to those who wished to gain a closer knowledge of the results of this equipment in actual operation.

CRACRAFT, LEICH ELECTRIC COMPANY, Genoa, Ill., exhibited a full line of telephone instruments and the Cracraft-Leich restoring drop, designed for magneto multiple switchboards and also the adaption of this drop in connection withclearing out drops of non-multiple magneto boards.

Included in the exhibit was the well known automaphone for providing the equivalent of common battery service for magneto exchanges; a complete display of farm line sets; common battery sets, and the Stewart test set, which interested many of the visitors.

Secretary and General Manager O. M. Leich, Salesmanager A. J. Kohn, T. J. Gullion and H. W. Hogue represented the company.

ELECTRICAL CONTRACT COMPANY, Grinnell Ia., exhibited photographs and blue-prints of work which the company had constructed. H. L. Beyer and G. L. Saunders were in attendance.

ELECTRICAL ENGINEERING COMPANY, Minneapolis, Minn., exhibited a complete line of Ericsson teiephone equipment. Other telephone specialties were demonstrated by W. E. Stevenson and H. A. Holden.

FRENCH BATTERY & CARBON COMPANY, Madison, Wis., was represented by A. L. Thompson, salesmanager; A. C. Matthews, W. H. Conlin and W. B. Schulte, all of Madison; and G. A. Shipley and G. H. Riebeth.

The company's display was especially attractive in that the effect of good and poor batteries on transmission was shown by means of equipment adapted to switch from good to bad cells. Poor adjustment of transmitters and improper connections and their effects were shown regardless of the age of the batteries.

GARFORD MAUFACTURING COMPANY, Elyria, Ohio, exhibited a splendid display of magneto and common battery apparatus; their standard No. 2 P. X. B. board, and a cordless P. X. B. board.

A convertible switchboard was used to explain the various different features to the visitors.

Garford literature was distributed and copies of Gar-Facts, the company's house organ, was presented to all those visiting the display.

A. G. Bean, vice-president; R. H. Manson, chief engineer; G. A. Scoville, salesmanager; A. J. Roberts, G. A. Joy and A. E. Overshiner were in charge of the exhibition.

GUND MANUFACTURING COMPANY, La Crosse, Wis., exhibited the company's latest types of D. & T. anchors. C. R. Piepen was in charge.

HOLTZER-CABOT ELECTRIC COMPANY, Brookline, Mass., was represented by Robert Hall and C. T. Hickman, both of the Chicago office.

INDIANA RUBBER & INSULATED WIRE COMPANY, Muncie, Ind., presented souvenir canes and literature pertaining to the many purposes of the company's product to all visitors. General Sales Manager Robert Miller was in charge of the exhibition.

KELLOGG SWITCHBOARD & SUPPLY COMPANY, Chicago, exhibited as usual a large and comprehensive display of its well known equipment.

The company's automatic recall switchboard created quite a sensation among the visitors. Many demonstrations were made during convention days and a great number of Minneapolis operators witnessed the simplicity in the switching of subscribers.

Simplicity of automatic ringing, elimination of listening keys, secret service and peg count were features which upon demonstration proved convincingly the value of individual service.

Included in the exhibit a universal type demonstrating switchboard for medium sized cities was used to show the value of changing from magnet to common battery service, each line individually.

KELLOGG APPARATUS parts mounted on folding panels, a huge glass desk telephone illuminated by tungstens and a big model of the Kellogg factory were additional features of the exhibit.

Those in attendance were E. G. Laurence, A. J. Carter, F. L. Eldridge, E. I. Pratt and George Crandall.

W. N. MATTHEWS & BROTHER, INC., St. Louis, Mo., featured a miniature pole line demonstrating the various uses of Matthews' specialties. Edward Bakewell and W. E. Bischoff explained the various specialties.

MONARCH TELEPHONE MFG. CO., Ft. Dodge, Iowa, had an exhibit of a three-position magneto switchboard recently sold to the Woodbine Telephone Co. ofd Iowa. The board was equipped with all Monarch features, including selective ringing, direct current, standard trunking apparatus, double lamp recall, and double supervision on cord and multiplying

of farm lines making, in order to make make them easily accessible by all operators.

A steel exhibit rack constructed of the same material as used in Monarch switchboards was used to carry the company's various products, including a complete line of Monarch telephone sets and parts.

Messrs. Palmer, Wilson, Black, Mitchell, Merriman, Hubacker, and Trumbull represented the company's exhibit.

National Carbon Co., Cleveland, Ohio., exhibited Columbia dry cells and duplex batteries. The exhibit was in charge of I. B. Crissman.

Nangle Pole & Tie Co., Chicago, was represented by W. G. Frostenson and H. W. Mitchell, who explained interesting photographs showing the company's poles and materials.

Nungesser Carbon & Battery Co., Cleveland, Ohio, exhibited the well-known 1900 dry cell and metallic brushes for automobile electric self-starters. H. S. Greene, G. A. Briggs and W. Jones explained the various merits of the company's products.

Northwestern Electric Equipment Co., St. Paul, Minn., represented by A. J. Anderson, exhibited a complete line of telephone specialties.

Page & Hill Co., Minneapolis, displayed a unique exhibit of raw timber and the various stages in making poles. L. L. Hill and L. A. Page were in attendance.

Premier Electric Co., Chicago, was represented by its president, O. E. Dennis.

Reliable Electric Co., Chicago, exhibited a complete line of protective apparatus. The new flat fuse cable, claimed to be very easily re-fused, was of special interest. A new type of unprotected porcelain cable terminals; many types of substation protectors and fuse blocks and a zinc cable hanger were on exhibition. W. L. Cook and G. W. Rodormer were in charge of the display.

John A. Roebling's Sons Co., Trenton, N. J., presented the visitors with valuable literature relative to the company's wire and cable. T. P. Suplee and W. H. Slingluff gave out the information that the fire which recently occurred in the company's plant would not interrupt prompt delivery.

Runzel-Lenz Electric Mfg. Co., Chicago, was represented by its secretary and treasurer, J. M. Lenz.

Standard Underground Cable Co., Pittsburgh, Pa., offered valuable literature and specimens to convention visitors. R. E. Greene and H. K. Weld were on the floor.

Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., and Chicago, exhibited a full line of its standard products. Its popular magneto exchange switchboard was of considerable interest to visiting operators. Included in the exhibit also were the company's popular compact telephones, compact cordless board, and central energy telephones, desk stands, combination telephones and a new oak residence telephone.

Considerable interest was displayed in an interesting line of inter-communicating telephones and various other specialties, including telo-detectives, def-fones, wireless receivers, call-a-phone signal system and testing sets.

Every part in the construction of Stromberg switchboards were on exhibition, each part labeled and identified with its individual type of board to which it belonged.

The exhibition was in charge of F. K. Cannon, E. A. Reinke, A. M. Haulrich and L. E. LaFleur assisted.

Suttle Equipment Co., Olney, Ill., exhibited a full line of telephone supplies for various makes of apparatus. Screws in all sizes fitting any type telephone and also cords are included in the company's regular stock. H. H. Knipe and M. C. Suttle were in charge.

Swedish-American Telephone Co., Chicago, exhibited magneto and common battery sets which were fully demonstrated by Frank Pardee and E. F. McCord.

Valentine-Clark Co., Minneapolis, was represented by E. L. Clark, L. A. Furlong, Gilbert Willson and J. Alec Navarre. The display consisted of a miniature pole treating plant in operation; sectional views of poles showing the action of the preservative, and an electric railway system showing the company's facilities for shipping poles.

Volunteer Fireman Signal Co., Minneapolis, represented by O. H. Tracy, president, featured a rotary automatic fire alarm for use in towns having volunteer fire departments, factories, hotels, large apartments, etc. The apparatus allows the operator to inform all volunteer-firemen or in factories, all watchmen, within a minute after receiving telephone fire alarm call.

Fairmont Electric Company, Philadelphia, Pa., represented by J. C. Vogel in a full line of telephone specialties.

White Company, Cleveland, Ohio, represented by Messrs. Williams and Lusk, brought to the attention of the visitors the latest construction in power driven winch motor trucks for hauling telephone poles. Mr. Williams explained the various advantages of motor trucks in telephone work. Interesting photographs were shown illustrating White trucks operating successfully in telephone work.

Western Red Cedar Association Meets

Western Red Cedar Association held its ninth annual meeting, January 11, in the offices of the Lindsley Brother Company, Spokane, Wash.

Following a report of the secretary-treasurer, which showed a very satisfactory balance, President Flannery delivered his annual address in which he emphatically prophesied that industrial expansion will see its greatest expansion in the coming year. All of which will mean better times and increased business and prosperity for the cedarmen's industry.

Officers for the ensuing year were then elected as follows: W. M. Leavitt, president; E. T. Chapin, vice-president; R. L. Bayne, secretary-treasurer, re-elected; Messrs. McDonald, Culver and Burn, directors: Committee on railroads, C. P. Lindsley, T. J. Humbird and H. C. Culver; committee on poles, E. A. Lindsley, W. P. Flannery and G. C. McDonald; committee on official inspection, C. P. Lindsley, E. L. Clark and R. G. Jones; committee on posts, F. C. Culver, L. D. McFarland and John A. Humbird; committee on piling, E. T. Chapin, F. C. Culver and M. P. Flannery.

Following the election the members adjourned to the Davenport Hotel where luncheon was served and interesting talks delivered by T. J. Humbird, H. C. Culver and C. P. Lindsley.

Ohio Independents Meet at Dayton

Representatives of independent telephone companies identified with the Ohio Independent Telephone Association assembled in Dayton, January 15 to attend the fourth district convention. L. A. Miller of Darrtown, of the fifth district, presided, and Delos O'Dell of Springfield, acted as secretary. Allan Surrell, general manager of the Dayton division of the Ohio Telephone Company, welcomed the visiting delegates. Substantial improvements and extensions, work and activities of the association during the past year, explanations in detail on the new system of accounting obligatory on telephone companies as prescribed by the interstate commission and the Ohio public utilities commission for telephone companies, were among the topics discussed at this conference.

Minnesota Independents Convene

The Minnesota Independent Telephone Association met at Dyckman Hotel, Minneapolis, January 19 and 20, at the same time the Independent Telephone Association of America was holding its annual convention at Hotel Radisson.

A feeling of dissension prevailed throughout the entire meeting especially in passing upon new memberships. At first each applicant for membership was thoroughly considered in order to avoid the Bell interests from "stealing a march." Finally all applicants were admitted and the election of officers took place. The officers of last year were re-elected.

Registered at the Convention

Alphabetical List of the Visitors at the Minneapolis Meeting

Albee, M. E., Shell Lake Telephone Co., Shell Lake, Wis.
Arvig, Charles G., Washburn, N. D.
Abel, George B., Stevens County Telephone Co., Morris, Minn.
Axness, Martin, manager, Home Telephone Co., Grand Meadow, Minn.
Axness, Mrs. Martin, Grand Meadow, Minn.
Ash, H. S., Bedford Telephone Co., Bedford, Ia.
Barnard, Reed C., St. Paul Electric Co., St. Paul, Minn.
Barry, R. L., general superintendent, Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Bertleson, H. B., La Crosse Telephone Co., La Crosse, Wis.
Bertleson, H., La Crosse Telephone Co., La Crosse, Wis.
Beliveau, O. A., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Beckstrom, John A., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Bentley, Robert S., Bentley Telephone Co., Fairbank, Iowa.
Burger, Herman, Morristown Telephone Co., Morristown, Minn.
Brown, Miss Margary, Minneapolis, Minn.
Brown, Verne, Minneapolis, Minn.
Bogart, J. V., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Barthen, J., Chippewa Falls, Wis.
Bates, E. I., Chippewa County Telephone Co., Chippewa Falls, Wis.
Bradley, H. E. secretary, Eastern Traffic Association, Philadelphia, Pa.
Brown, H. A., manager, Griggs County Telephone Co., Cooperstown, N. D.
Borman, M. M., Abercrombie Telephone Co., Abercrombie, N. D.
Batte, B. H., Utilities Service Co., St. Louis, Mo.
Brockwell, H. E., chief engineer, Manitoba Government Telephones, Winnipeg, Man., Can.
Barber, E. L., vice-president, Inter-State Independent Telephone & Telegraph Co., Aurora, Ill.
Bucher, H. S. Astoria Telephone Exchange, Astoria, Ill.
Beyer, Harold L., president, Interior Telephone Co., Grinnell, Iowa.
Brande, E. B., B. J. Carney & Co., Grinnell, Iowa.
Bryant, W. H., vice-president and general manager, Home Telephone Co., Mobile, Ala.
Brust, Wm., Sleepy Eye Telephone Co., Sleepy Eye, Minn.
Blakeslee, P. R., Peoples Telephone Co., Spring Valley, Minn.
Bahr, G. E., Morristown, Minn.
Ball, W. B., Lake City, Minn.
Bartholomew, E., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Bakewell, Edward, W. N. Matthews & Bros., St. Louis, Mo.
Bean, A. G., Garford Mfg. Co., Elyria, Ohio.
Briggs, Glenn A., Nungesser Carbon & Battery Co., Cleveland, Ohio.
Bartley, N. P., Automatic Electric Co., Chicago.
Bell, M. J., Bell Lumber Co., Minneapolis, Minn.
Brown, E. L., American Electric Co., Chicago.
Burns, P. C., American Electric Co., Chicago.
Bischoff, W. E., W. N. Matthews & Bro., Chicago.
Buck, A. C., Farmers & Merchants Telephone Co., Arlington, Minn.
Curtis, W. T., American Electric Co., Chicago.
Carter, A. J., Kellogg Switchboard & Supply Co., Chicago.
Cooke, M. W., Philadelphia, Pa
Conlin, W. H., French Battery & Carbon Co., Madison, Wis.
Crandall, George H., Kellogg Switchboard & Supply Co., Chicago.
Curtis W. N., Automatic Electric Co., Chicago.
Carlson, F. J., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Clark, Lyle H., Valentine-Clark Co., Minneapolis, Minn.
Church, W. C., Lumber Co., Des Moines, Ia.
Cook, W. L., manager, Reliable Electric Co., Chicago.
Clark, E. L., Valentine-Clark Co., Minneapolis, Minn.
Clegg, G. C., Chicago.
Casey, John F., Kinlock Telephone Co., St. Louis, Mo.
Crosswell, M. H., Julius Andrae & Sons' Co., Milwaukee, Wis.
Coffey, John W., Coffey System & Audit Co., Indianapolis, Ind.
Corwin, M. J., Frank B. Cook Co., Chicago.
Connors, H. W., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Conner, L. J., Chippewa Falls, Wis
Currier, H. D., Kellogg Switchboard & Supply Co., Chicago.
Clark, B. B., Amreican Telephone Fire Alarm Co., Chicago.
Crowley, Mrs. J. C., Superior, Wis.
Conway, Mrs. T. F., Superior, Wis.
Critchfield, H. D., Automatic Electric Co., Chicago.
Christenson, Paul, Redwood Falls Electric Telephone Co., Redwood Falls, Minn.
Cannon, F. K., Stromberg-Carlson Telephone Mfg. Co., St. Paul, Minn.
Churchill, W. H., chief accountant, Saskatchewan Government Telephones, Regina, Sask., Can.
Crowley, J. C., Jr., manager, Peoples Telephone Co., Superior, Wis.
Cummings, R. S., Elk Mound, Wis.
Clay, W. S., general manager, Hutchinson Telephone Co., Hutchinson, Minn.
Clark, L. F., Bellingham Telephone Co., Bellingham, Minn.
Colby, E. J., Peoples Telephone Co., Stewartville, Minn.
Carley, James A., Greenwood Prairie Telephone Co., Plainview, Minn.
Cole, W. L., secretary, Lyle Telephone Co., Lyle, Minn.
Cragg, A. C., auditor, Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Curtis, O., local manager, Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Cuppy, F. O., manager, LaFayette Telephone Co., LaFayette, Ind.
Chambers, B. Y., traffic superintendent, Central Home Telephone & Telegraph Co., Louisville, Ky.
DeForest, W. A., Julius Andrae & Sons' Co., Milwaukee, Wis.
Duncan, J. C., Peoples Telephone & Telegraph Co., Knoxville, Tenn.
Dean, W. H., vice-president, Oregon-Washington Telephone Co., Hood River, Ore.
Deering, M. E., Manitoba Government Telephones, Winnipeg, Man., Can.
Daicey, Elmer E., South Bend, Ind.
Daicey, Mrs. E. E., South Bend, Ind.
Dalrymple, E., Elk Mound, Wis.
Dudley, E. C., Tri-State Telephone & Telegraph Co., Pine City, Minn.
Dix, W. D. Becker-Mahnomen Telephone Co., Detroit, Minn.
Dunn, B. M., manager, Farmers & Citizens Mutual Telephone Co., Springfield, Minn.
Cassaday, O. F., Kellogg Switchboard & Supply Co., Chicago.
Dawson, R. A., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Dwelle, G. M., Dwelle Telephone Co., Lake City, Minn.
Dustin, Fred G., Northern Electrical Co., Minneapolis, Minn.
Evarts, A. H., president, Mutual Telephone Co., West Concord, Minn.
Eldridge, F. L., Kellogg Switchboard & Supply Co., Chicago.
Eckhoff, E. H., Hayward Telephone Co., Hayward, Wis.
Edwards, S. R., *Telephony*, Chicago.
Extrom, V. E., Tomahawk Light, Telephone & Improvement Co., Tomahawk, Wis.
Ellestad, Irwin, Farmers & Merchants Telephone Co., Lanesboro, Minn.
Evans, L. F., Brown's Valley Telephone Co., Brown's Valley, Minn.
Frostenson, William G., Naugle Pole & Tie Co., Chicago.
Furlong, L. A., Valentine-Clark Co., Minneapolis, Minn.
Fidelity, J. H., manager, Citizens Home Telephone Co., Belle Plaine, Minn.
Frykmann, Oscar M., Minneapolis, Minn.
Frykmann, P. L., Tri-State Telephone & Telegraph Co., Minnneapolis, Minn.
Finley, J. H., Automatic Electric Co., Chicago.
Fisk, F. E., City Telephone Co., Tuttle Lake, Wis.
Ferguson, P. M., Mankato Citizens Telephone Co., Mankato, Minn.
Froberg, Alfred, Canby Telephone Co., Burr, Minn.
Freedholn, E. R., Kandiyohi Independent Telephone Co., Kandiyohi, Minn.

Fowler, W. H. Fowler Telephone Co., Pella, Iowa.
Funk, Warren S., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Grant, Harris S., Jr., Page & Hill Co., Minneapolis, Minn.
Green, Russell E., Standard Underground Cable Co., Detroit, Mich.
Gettle, Louis E., secretary, Wisconsin Railway Commission, Madison, Wis.
Griffen, George F., president, Amery Electric Co., Amery, Wis.
Gullion, T. J., Cracraft-Leich Electric Co., Genoa, Ill.
Gooding, A. C., secretary, Rochester Telephone Co., Rochester, Minn.
Goodrich, W. F., secretary, La Crosse Telephone Co., La Crosse, Wis.
Griffith, Charles, Johnstown, Pa.
Greaves, Jay, McLeod County Telephone Co., Glencoe, Minn.
Greaves, Mrs. Jay, Glencoe, Minn.
Gulden, J. L., Inter-State Telegraph & Telephone Co., Austin, Minn.
Howarth, R. S., St. Paul Electric Co., St. Paul, Minn.
Howard, W. I., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Hunt, E. G., Manitoba Government Telephones. Winnipeg, Man.
Herrick, L. A., Stephenson County Telephone Co., Freeport, Ill.
Herman, P. C., St. Croix Telephone Co., New Richmond, Wis.
Hartwell, H. P., secretary, Tri-County Farmers Telephone Co., Irene, S. D.
Huleenthal, H. W., United Telephone Co., Afton, Okla.
Hendrickson, H. C., Acton Telephone Co., Litchfield, Minn.
Holdahl, Olaf, Roseau Telephone Co., Roseau, Minn.
Hitch, J. E., secretary, Kandiyohi County Telephone Co., Svea, Minn.
Hastie, J. R., Telephony Publishing Co., Chicago.
Hanson, A. H., Tri-State Telephone & Telegraph Co., Windom, Minn.
Hawthorne, A. D., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Hanson, A. H., Tri-State Telephone & Telegraph Co., Windom, Minn.
Hallett, S. I., St. Paul Electric Co., St. Paul, Minn.
Hubacker, J. C., Monarch Telephone Mfg. Co., Fort Dodge, Iowa.
Hamilton, C. L., Page & Hill Co., Minneapolis, Minn.
Hunter, A. D., Minneapolis, Minn.
Herr, J. G., MacMartin Advertising Co., Minneapolis, Minn.
Hogue, H. W., Cracraft-Leich Electric Co., Indianapolis, Ind.
Horton, B. O., St. Paul Electric Co., St. Paul, Minn.
Huffman, C. C., Kellogg Switchboard & Supply Co., Chicago.
Hatfield, Chas. F., field secretary, Panama-Pacific Exposition, Chicago.
Hill, L. L., Page & Hill Co., Minneapolis, Minn.
Haubrich, A. M., Stromberg-Carlson Telephone Mfg. Co., Chicago.
Hammond, H. E., American Electric Co., Chicago.
Ingram, George A., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Jones, W. P., Matheny Telephone Co., Walthill, Neb.
Johnson, H. O., Sleepy Eye Telephone Co., Sleepy Eye, Minn.
Johnson, George W., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Jones, W. X., Tri-State Telephone & Telegraph Co., Minenapolis, Minn.
Jones, Warner, Nungesser Carbon & Battery Co., Cleveland, Ohio.
Juergen, F. H., Jordan Telephone Co., Jordan, Minn.
Jarold, J. A., Baldwin Telephone Co., Baldwin, Wis.
Johnson, Hugo, Sleepy Eye Telephone Co., Sleepy Eye, Minn.
Johnson, Levi, Watertown Telephone Co., Watertown, Minn.
Kohn, A. J., Cracraft-Leich Electric Co., Genoa, Ill.
Kellogg, L. D., Kellogg Switchboard & Supply Co., Chicago.
Kleaner, Albert, manager, Redwood County Rural Telephone Co., Redwood Falls, Minn.
Klingel, E. L., Garford Mfg. Co., Elyria, Ohio.
King, M. H., Tri-State Telephone & Telegraph Co., Litchfield, Minn.
Knutson, M., Swift County Telephone Co., Benson, Minn.
Knipe, H. H., Commercial Telephone & Telegraph Co., Olney, Ill.
Kruger, O. C., Star Prairie Telephone Co., Star Prairie, Wis.
Kast, E. C., secretary, Grant County Telephone Co., Milbank, S. D.
Kurz, Harry, secretary, Annandale Telephone & Exchange Co., Annandale, Minn.
Kohn, Otto, New Ulm Rural Telephone Co., New Ulm, Minn.
Kelsey, I. C., Telephony Publishing Co., Chicago.
Kappauf, L. G., Interstate Telegraph & Telephone Co., Austin, Minn.
Kellogg, C. A., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Larson, J. H., Peoples Independent Telephone Co., Winthrop, Minn.
Lones, S. B., Tri-State Telephone & Telegraph Co., Pine City, Minn.
Lusk, M. W., The White Co., Cleveland, Ohio.
Long, H. H., vice-president, Gund Mfg. Co., La Crosse, Wis.
Lenz, J. M., Runzel-Lenz Electric Co., Chicago.
LaFluer, L. E., Stromberg-Carlson Telephone Mfg. Co., Chicago.
Leich, O. M., secretary, Cracraft-Leich Electric Co., Genoa, Ill.
Lawrence, E. G., Kellogg Switchboard & Supply Co., Minneapolis, Minn.
Larsen, Nils J., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Lahiff, J. F., Breckenridge Telephone Co., Breckenridge, Minn.
Lockhart, J. M., Pitsburgh, Pa.
Lockhart, J. H., Pittsburgh, Pa.
Lueders, H. F., secretary, Norwood-Young America Telephone Co., Norwood, Minn.
Lindquist, F. D., secretary, Fulda Telephone Co., Fulda, Minn.
Miller, J. W., Moody County Telephone Co., Flandreau, S. D.
Miller, Robert, Indiana Steel & Wire Co., Muncie, Ind.
McPeek, George, Lincoln County Telephone Co.
Manson, Ray H., Garford Mfg. Co., Elyria, Ohio.
Mess, Karl, Price County Telephone Co., Phillips, Wis.
Mattson, C. W., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Madden, J. E., Waseca Telephone Co., Waseca, Minn.
Macoubrey, T. C., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
McElroy, W. R., Chicago.
McCord, E. F., Swedish-American Telephone Co., Chicago.
Malthaner, C. O., Minneapolis, Minn.
Matthews, A. C., French Battery & Carbon Co., Madison, Wis.
Mock, Ed J., TELEPHONE ENGINEER, Chicago.
Moore, J. M., Frank B. Cook Co., Chicago.
Macduff, R. E., Paragon Electric Co., Chciago.
Mitchell, H. W., Naugle Pole & Tie Co., Chicago.
Merriman, B. H., Monarch Telephone Mfg. Co., Omaha, Neb.
Miller, F. S., United Telephone Co., Afton, Okla.
McInnes, A. J., secretary, Central North Dakota Co-operative Telephone Co., Dazey, N. D.
Marceau, A. F., commercial representative, Tri-Sstate Telephone & Telegraph Co., St. Paul, Minn.
Myers, N. L., manager, Jackson Telephone Co., Jackson, Minn.
McCulloch, A. J., general manager, Zenith Telephone Co., Duluth, Minn.
Marvin, F. C., Zumbrota Telephone Co., Zumbrota, Minn.
Mollison, W. S., Rice County Rural Telephone Co., Faribault, Minn.
Myers, H. G., Waseca Telephone Co., Waseca, Minn.
Malone, J. A., Rochester Telephone Co., Rochester, Minn.
McDermott, J. F., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
McKellar, D. A., Tri-State Telephone & Telegraph Co., Excelsior, Minn.
Moeri, Fred, Chippewa County Telephone Co., Chippewa Falls, Wis.
Navarre, J. Alex, Valentine-Clark Co., Toledo, Ohio.
Neill, D. M., president, Red Wing Telephone Co., Red Wing, Minn.
Neill, V. S., secretary, Red Wing Telephone Co., Red Wing, Minn.
Nelson, F. A., president, Kandiyohi County Telephone Co., Kandiyohi, Minn.
Noehl, N., manager, Watkins Telephone Co., Watkins, Minn.
Neill, Mrs. D. M., Tri-State Telephone & Telegraph Co., Red Wing, Minn.
Ovitt, C. L., Northern Telephone Co., Enosburg Falls, Vt.
Odegard, J. F., Red Valley Telephone Co., Northwood, N. D.
Olcott, Fred, St. Croix Valley Telephone Exchange Co., St. Croix Falls, Wis.
Olcott, Fred, St. Croix Valley Telephone Exchange Co., St. Croix Falls, Wis.
Ocobock, George W., Norwood-Young America Telephone Co., Norwood, Minn.
Overshiner, A. V., Garford Mfg. Co., Elyria, Ohio.
O'Reilly, M. J., Osceola Mutual Telephone Co., Osceola, Wis.
Peterson, Arnold, Lerdahl Telephone Co., Clarks Grove, Minn.
Pieper, C. R., Gund Mfg. Co., La Crosse, Wis.
Page, L. A., Jr., Page & Hill Co., Minneapolis, Minn.
Peel, Charles R., American Telephone Fire Alarm Co., Chicago.
Pratt, Edward I., Kellogg Switchboard & Supply Co., Chicago.
Pardee, F. W., Swedish-American Telephone Mfg. Co., Chicago.
Palmer, R. O., Monarch Telephone Mfg. Co., Ft. Dodge, Iowa.

FOR THE 18TH TIME

The National Independent Telephone Association

WILL HOLD AN ANNUAL CONVENTION

This Time at Chicago, February 3, 4, 5
AT THE HOTEL LA SALLE

Please meet us—We will be there

The Program will interest you. Subjects will be discussed by speakers of National reputation.

We Will Show You the Latest in Telephone Equipment

"WE" ARE:

American Electric Company
American Telephone Fire Alarm Company
Andrae (Julius), & Sons, Company
Automatic Electric Company
Automatic Time Stamp Company
Coffey System & Audit Company
Cook, Frank B., Company
Cox Lightning Arrester Company
Cracraft-Leich Electric Company
Electric Storage Battery Company
Everstick Anchor Company
Garford Manufacturing Company
Gund Manufacturing Company
Holtzer Cabot Electric Company
Illinois Electric Company
Indiana Wire & Steel Company
International Harvester Company
Johns-Manville, H W., Company
Kellogg Switchboard & Supply Company
Klein, Mathias, & Sons
Manhattan Electrical Supply Company
Matthews, W. N., & Brother
Monarch Telephone Manufacturing Company
National Carbon Company
Naugle Pole & Tie Company
Nungesser Carbon & Battery Company
Page & Hill Company
Phono-Print Company
Rand Company, The
Reliable Electric Company
Roebling's, John A., Sons Company
Sparta Manufacturing Company
Standard Underground Cable Company
Stewart Brothers
Stromberg - Carlson Telephone Manufacturing Company
Swedish - American Telephone Manufacturing Company
Telephone Printing Company
Thompson Levering Company
Utilities Indemnity Exchange
White Company, The

INDEPENDENT LOCAL AND LONG DISTANCE TELEPHONE

COME direct to the Hotel La Salle, Madison and La Salle Streets. Go to Room 1758 and check your coat and grip until you locate. Register in Room 1757—the Association headquarters. Inquire for mail. Go into the writing room next door and write "her," telling you are O. K. and in good hands. Then come to see each of us and as we have been telling you, "we will show the latest in telephone equipment." Visit every room on the 17th floor. Then go to the meetings on the 19th floor. Then back to see us. Repeat this regularly every three hours for three days.

THE BANQUET IS THURSDAY EVE

The man who is selling good goods is always willing to show them

Parlett, Albert, Bristol Telephone Co., Bristol, Tenn.
Patterson, W. J., Saskatchewan Government Telephones, Regina, Sask., Canada.
Peshook, S. J., St. Ansgar Telephone Co., St. Ansgar, Iowa.
Pellatt, W. C., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Peterson, Albert, Chisago City Telephone Co., Chisago City, Minn.
Quist, I. E., Red Lake-Eastern Marshall Farmers Telephone Co., Thief River Falls, Minn.
Quinn, William, Wright County Telephone Co., Waverly, Minn.
Quimby, L. L., Brownsdale, Minn.
Quimby, Jasper, Brownsdale, Minn.
Roll, W. H., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Roberts, A. J., Garford Mfg. Co., Kansas City, Mo.
Reinke, E. A., Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.
Rodormer, George W., Reliable Electric Co., Chicago.
Robinson, D. B., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Roepke, Fred, Fairmont Telephone Co., Fairmont, Minn.
Richardson, H., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Roepke, G. F., Rural Union Telephone Co., Livermore, Iowa.
Rees, C. W., Tri-State Telephone & Telegraph Co., Grand Forks, N. D.
Randall, C. B., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Robinson, G. W., president, Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Robertson, W. S., Argyle Telephone Co., Argyle, Minn.
Reber, H. Linton, Kinlock Telephone Co., St. Louis.
Runkel, F. H., Portage Telephone Co., Portage, Wis.
Ramswick, O. M., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Rinde, O. P., Mankato, Minn.
Roos, Nino C., North Star Telephone Co., Finlayson, Minn.
Reynolds, E. H., Long Lake, Minn.
Roos, G. H. Spooner Telephone Co., Spooner, Wis.
Rolston, J. Earle, Ainsworth Telephone Co., Ainsworth, Nebr.
Rowlands, E. A., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Rettig, F., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Smith, J. A., *The Transmitter*, Fort Worth, Texas.
Suttle, M. C., The Suttle Equipment Co., Olney, Ill.
Saundere, G. L., Electrical Contract Co., Grinnell, Iowa.
Shaver, Roy B., Interstate Commerce Commission, Washington, D. C.
Seeley, Fred, Kellogg Switchboard & Supply Co., Elwood, Ind.
Scoville, George A., Garford Mfg. Co., Elyria, Ohio.
Stazak, M. B., Kellogg Switchboard & Supply Co., Chicago.
Schaning, Chris, Canby Telephone Co., Porter, Minn.
Schuelter, J. W., St. Paul Electric Co., St. Paul, Minn.
Storkerson, I. M., La Crosse Telephone Co., La Crosse, Wis.
Suplee, T. P., John A. Roebling's Sons Co., Minneapolis, Minn.
Slingluff, W. H., John A. Roebling's Sons Co., Chicago.
Schutte, W. B., Northern Chemical Engineering Laboratories, Madison, Wis.
Schoell, J. A., Citizens Home Telephone Co., Belle Plaine, Minn.
Swenson, Charles A., Atwater Telephone Co., Atwater, Minn.
Shepardson, George D., University of Minnesota, Minneapolis, Minn.
Sando, O. T., Berthold Farmers Telephone Co., Berthold, N. D.
Seybold, H. A., Nicollet County Telephone & Telegraph Co., St. Peter, Minn.
Seymour, A. J., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Sterns, George L., Tri-State Telephone & Telegraph Co., Thief River Falls, Minn.
Spooner, H. W., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Stafford, J. J., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Schade, E. D., Johnstown Telephone Co., Johnstown, Pa.
Settergren, Chris, Baldwin Telephone Co., Baldwin, Wis.
Smith, Eugene R., St. Paul Electric Co., St. Paul, Minn.
Smith, M. W., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Shands, A. J., Kinlock Telephone Co., St. Louis, Mo.
Shufflin, T. J., Peoples Telephone Co., Butler, Pa.
Smith, W. L., Badger State Telephone & Telegraph Co., Neillsville, Wis.
Steninger, J. A., Steininger Telephone Co., Parker, S. D.
Snovalka, William, New Prague Telephone Co., New Prague, Minn.
Shipley, G. A., French Battery & Carbon Co., Madison, Wis.
Smith, L. J., St. Croix Telephone Co., New Richmond, Wis.
Taylor, Idella Cushman, Minncapolis, Minn.
Thompson, A. L., French Battery & Carbon Co., Madison, Wis.
Trumbull, L. Q., Monarch Telephone Mfg. Co., Fort Dodge, Iowa.
Thompson, T. E., Colfax, Wis.
Tollefson, H. M., Kasson & Mantorville Telephone Co., Kasson, Minn.
Tollefson, H. M., Kasson & Mantorville Telephone Co., Kasson, Minn.
Thomas, William, Springfield, Minn.
Thayer, Wayne, Sioux Telephone Co., Rock Valley, Iowa.
Treash, W. S., Tri-State Telephone & Telegraph Co., St. Paul, Minn.
Tompkins, John F., Frank B. Cook Co., Chicago.
Underwood, W. G., Eastern Pennsylvania Independent Telephone Association, Chambersburg, Pa.
Upson, E. A., Lake Crystal, Minn.
Uhl, Walter G., Logansport Home Telephone Co., Logansport, Ind.
Vogel, J. C., Fairmount Electric & Mfg. Co., Philadelphia, Pa.
Van Sant, J. W., Interstate Commerce Commission, Washington, D. C.
Vopatek, S. A., New Prague Telephone Co., New Prague, Minn.
Vollmer, Philip, Kimball, Minn.
Vannatta, Wellesley, Pierce County Telephone Co., River Falls, Wis.
Watts, Wm. H., Tri-State Telephone & Telegraph Co., Minneapolis, Minn.
Williams, F. H., The White Co., Cleveland, Ohio.
White, F. M., Pierce County Telephone Co., River Falls, Wis.
Wilder, G. L., Granite Falls Telephone Co., Granite Falls, Minn.
Woodward, D. L., Rural Union Telephone Co., Humboldt, Iowa.
Weirich, P. J., United Telephone Co., Monroe, Wis.
Wilson, J., Groton-Fenney Telephone Co., Groton, S. D.
Webb, C. J., Zumbro Valley Telephone Co., Byron, Minn.
Woolley, Howard Lake, Minn.
Wilcox, A. E., Bricelyn Mutual Telephone Co., Bricelyn, Minn.
Wohlhuter, W., Tri-State Telephone & Telegraph Co., Albert Lea, Minn.
Warren, F. A., chief engineer, Department of Telephones, Regina, Canada.
Wandel, J. H., Tri-State Telephone & Telegraph Co., Pine City, Minn.
Wickstrom, H. W., Clover Belt Telephone Co., Sandstone, Minn.
Wyatt, Hal. C., Northwestern Electric Equipment Co., St. Paul, Minn.
Wilson, Gilbert, Valentine-Clark Co., Minneapolis, Minn.
Woodruff, Paul H., TELEPHONE ENGINEER, Chicago.
Wilson, George O., Monarch Telephone Mfg. Co., Cedar Rapids, Iowa.
Weld, Harold K., Standard Underground Cable Co., Chicago.
Zeitlow, J. L. W., Dakota Central Telephone Co., Aberdeen, S. D.

Western Pennsylvania Independents Convene

Western Pennsylvania Independent Telephone Association held its convention January 15 and 16 at Hotel Pitt, Pittsburgh. Nearly 150 delegates were in attendance. The first days' session was devoted to discussion of legislature measures affecting the telephone business. Exchange managers almost unanimously supported the 54 hours' work a week limit for operators, opposing a division of this period into six working days. The general opinion seemed to be that the public demanded Sunday telephone service and that it was almost impossible to put on a substitute relief of operators for one day a week only.

The second day's session was devoted to election of officers which were as follows: H. F. Webb, president; W. H. Wilson, first vice-president; J. H. Wright, second vice-president; Messrs. Patton, Schade and Schotte, executive committee.

It was announced that the association will meet again at Harrisburg in April.